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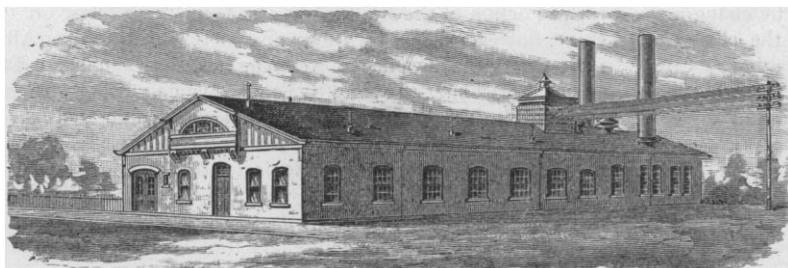
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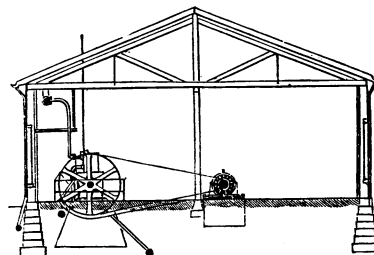
ELECTRIC LIGHTING.—A MODEL CENTRAL STATION.

EXPERIENCE has shown that to attain the best commercial results in electric lighting, the final expression of which comes out in

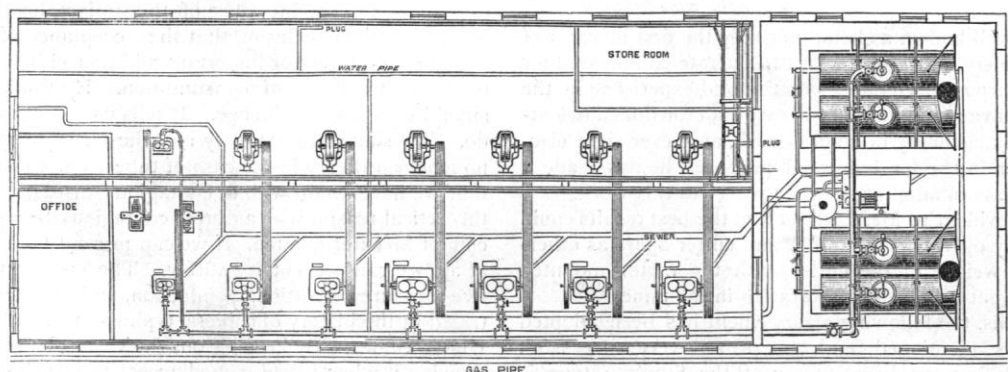
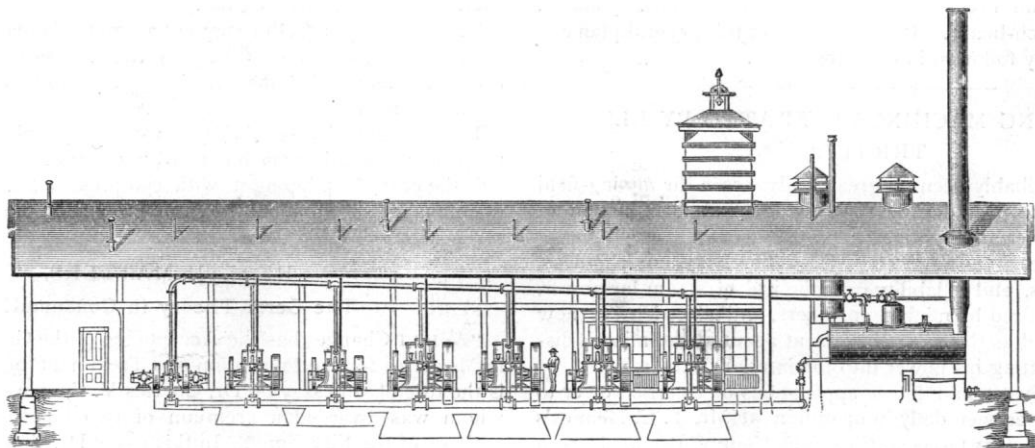
station, the reduced plan and elevations herewith, of a simple and efficient station, will be found of interest. The station is that of the East End Electric Light Company, at East Liberty, Penn., operating the Westinghouse alternate-current system of distribution. The service from this station covers a very extended area, comprising the business portion of the city, which lies within an average distance of half a mile from the station, ramifying through an extended series of residence streets of the better class, and carrying



WESTINGHOUSE ELECTRIC-LIGHT STATION AT EAST LIBERTY, PENN.



END-ELEVATION.



PLAN AND SIDE-ELEVATION OF WESTINGHOUSE ELECTRIC-LIGHT STATION AT EAST LIBERTY, PENN.

dividends, too much care and knowledge cannot be brought to bear upon the steam and electrical engineering involved in the construction of the plant, from the foundations of the building, to the lamp wired on the premises of the consumer. The conditions, however, are found so varied in different localities that it is manifestly impossible to establish any fixed rules. As an illustration, however, which seems to contain the essential ideas of a well-considered

one special line out as far as the distant suburb of Swissvale, the last lamp being at a distance of four miles and a quarter from the dynamo.

The arrangement of the station is clearly indicated. It is a substantial but inexpensive one-story building of brick, containing the offices of the company and the storeroom for material, in addition to the dynamo and boiler room. The plant at present has an ag-

gregate capacity of about 8,000 lamps. Dynamos and engines are on the same floor, every part of which is constantly under the eye of a single attendant. Both engines and dynamos stand on brick foundations, the floor itself being of cement. Each engine is belted direct to its dynamo, no power being wasted in transmission; and the subdivision of power enables the wide fluctuations of load to be met by stopping and starting any engine and dynamo as needed, thus operating the whole station under the highest possible economical conditions at any moment. The steam-pipe is brought along the engine-room overhead, and the engines exhaust into a main laid in a covered trench underneath the floor, every part being accessible. All drips and overflows are run into a sewer. Two exciting dynamos are provided, as shown on the left of the dynamo-room, each adequate to supply current to the fields of all the alternating dynamos of the station, and each driven independently by its own engine. But one engine and exciter is therefore run at any time, the other standing ready as a relay in emergency. Moreover, the position of the engines and exciters is such that by changing a belt either engine can drive either exciter, and thus the chance of possible stoppage is reduced fourfold. The Westinghouse Company regard this latter arrangement as representing the best possible engineering, and strongly urge it upon every station of any considerable magnitude. Two overhead travelling-cranes traverse the whole length of the building over the engines and dynamos.

In a station so arranged, the labor is reduced to a minimum. With natural gas, of course, but one fireman is required; firing with coal, two firemen will be on duty in the first run of the evening, and one in the second run. But one attendant is required in the dynamo-room at any time, the lightness of his duties permitting him to give all necessary attention to the engines, dynamos, exciters, and switch-board. It is obvious that this general plan can be advantageously followed in most instances.

COAL-MINING MACHINES OPERATED BY ELECTRICITY.

THERE has probably been no greater advance in the mining-field effected during the past decade than the general introduction of electricity for power and lighting purposes.

The advantage of using electricity, its simplicity, compactness, safety, cleanliness, and reliability over the use of steam for power, were early recognized by mining engineers, and electricity is now generally regarded as the most convenient agent at the miner's disposal for transmitting his power into the interior of the mine.

One of the newest and latest applications of electric power to mining-work can be seen daily in operation at Mr. T. C. Heimes's "Drane Colliery," near Osceola, Clearfield County, Penn. Here a most interesting application of motors for mining-work has been devised by Mr. F. M. Lechner for operating a coal-cutter by electricity.

Mr. Lechner is well known as being not only the first inventor of coal-cutting machinery, but also the first to operate compressed air in mines for this purpose. His long practice and experience in the coal-mining field have made him familiar with all the difficulties attending the use of machinery in mining-work, and, ever since electric power has been in use for industrial purposes, he has made a study of the problems in adapting electric power to this work.

It soon became evident to Mr. Lechner that the best results could only be obtained by operating the motor and cutter apart, as otherwise the size and weight of the cutter with the motor mounted upon it would prevent its easy transportation in the mine.

In order to do this, the following arrangement has been adopted in the mine before mentioned, and has proved very successful. The motor, which is a 10 horse-power of the Sprague type, is mounted upon a truck running upon rails, so that it can be very easily handled and hauled from one position to another, as occasion requires. The entire weight of the motor is less than 1,000 pounds.

The cutter operated by the motor, which in this case is the "New Lechner," is set in position in the room to be cleared, and is connected with the motor by a five-eighths inch rope belt, running in V-shaped grooved sheaves, one being on the motor, and the other on the cutter.

This connection is long enough to allow the motor to be operated 30 feet away from the cutter, and the motor has been set in a position in this mine 1,600 feet away from the dynamo. The motor is held in position by guys at the point of use.

By means of screw-jacks that can be easily adjusted to any height, with loose sheaves upon them, the cutter can be operated at any angle from the motor; and the connection is made taut by moving the truck upon which the motor rests, and securing it in the right position by guys.

All mining engineers are familiar with the difficulty attending the working of the cutters in the limited space generally allotted them in mines, and know how essential it is to have every machine divested of every pound of surplus weight. They also know what care must be exercised in moving it with great iron crowbars, to prevent injury to the more delicate parts of the engines; and, however careful, how frequent it is that connecting rods and other parts are so impaired that the machine has to be sent to the shop; then how the rugged action of the engines shakes every thing loose on the machine, however firmly they may appear to be adjusted. All this is removed by the absence of the engines, the machine running as smoothly as a buzz-saw, and, as a consequence, cutting with the same facility. By this plan, three machines can be operated by one motor; for, when one room is cut, the motor can at once be hauled to another room, where a machine is in readiness and position, cut that room, and pass to a third while the coal is being removed from the first two, and the cutters being again placed in position.

It was found, upon a preliminary trial of this apparatus at the Osceola Mines, that by its use two men are able to excavate 100 tons in 10 hours, and that they can move the cutter as often as desired without any auxiliary aid.

The efficiency of both dynamo and motor is over 90 per cent; so that, allowing 10 per cent drop on the line, nearly 73 per cent of the power delivered to the dynamo-pulley can be depended upon at the motor for work.

It has been estimated that the cost of equipping a mine for the purpose of operating machinery with electricity is only about one-half the cost of equipping it with compressed air, and the price of maintenance shows about the same proportion of saving.

HEALTH MATTERS.

The Germ Theory in Consumption.

"WHAT Changes has the Acceptance of the Germ Theory made in Measures for the Prevention and Treatment of Consumption?" is the title of an essay by Dr. Charles V. Chapin of Providence, to whom was awarded a premium of two hundred dollars by the trustees of the Fisk Fund. In this essay Dr. Chapin has given an admirable *résumé* of all that has been written about consumption from the time of Hippocrates to the present day. After a careful examination of the literature of the subject, he thinks that we are justified in the conclusion that the acceptance of the germ theory has made no direct or important addition either to the hygiene or medicinal treatment of consumption. He thinks, however, that it should have great influence. It tells us plainly what we ought to do. We simply do not obey its behests. The germ theory — now no longer a theory in the case of tubercular consumption — tells us that we have to do with a contagious disease. Now, there is no theoretical reason why a purely contagious disease like tuberculosis cannot be exterminated. If we can prevent the spread of contagion at all, we can prevent it entirely. The enormous value of preventive measures, isolation, disinfection, and quarantine, is well illustrated in the history of cholera, typhus-fever, and yellow-fever in the United States. By keeping out the virus of these diseases, or destroying it when it had gained access to our shores, we have for a number of years been remarkably free from these diseases, and it is certain that if these precautions had not been taken we should have suffered severely. For obvious reasons the suppression of tuberculosis is not so easy a matter as the suppression of cholera or yellow-fever. Neither is the suppression of scarlet-fever or small-pox as easy. Yet wherever the public have been educated to a correct appreciation of the contagious nature of scarlet-fever, the number of cases has diminished very much. Even in small-pox with its virulent contagion, it is possible, by means of isolation and

disinfection, to check its spread even among an unvaccinated population, as has been illustrated many times of late in the anti-vaccination city of Leicester, England. We must now put tuberculosis among these diseases, and, though its theoretical suppression is simple, its actual extermination is a very difficult problem. It lies largely with the medical profession how long tubercular disease shall decimate the human race. The physicians are the educators of the people in these matters. When the doctor shall teach that tuberculosis is contagious, the people will believe, and will govern themselves accordingly. In combating contagious diseases the preventive measures taken often give discouraging results. This will be particularly so in tubercular disease. Halfway measures secure less than halfway results, and these alienate the support of those who only indifferently believe in contagion and the importance of precautionary measures. Efficient means of suppression are radical, and bear hard on the individual: they are not complied with, and they produce violent opposition. Yet, difficult as it may be, the medical profession should take aggressive action against this disease. We have no right to wait for the discovery of a specific, or the gradual evolution of a phthisis-proof race. We must take the world as we find it, full of men and women predisposed to tubercular phthisis, and with no idea of its contagious nature. What can we do about it?

1. Teach the people the true nature of tuberculosis; that no one ever has tubercular consumption unless the tubercle bacilli find their way into the lungs.

2. Teach them also, that, even if it finds its way there, it will not grow unless the conditions are right. Teach fathers and mothers how to rear healthy boys and girls. Tell them what to eat and what to wear, to exercise, to breath fresh air. This alone would exterminate phthisis.

3. The contagion must be destroyed. Fortunately in this disease there is no need of isolation. Disinfection is enough. The consumptive patient gives off the poison only in the sputum, or perchance the other excreta, if the disease extend beyond the lungs. The virus is not given off from these while moist. We must therefore disinfect all sputum at once with mercuric bi-chloride. Cloths must be used instead of handkerchiefs, and then burned; or, if the latter are used, they should be often changed, and immediately put in a bi-chloride solution and boiled. Bed-linen should be treated in the same way. Frequent disinfection of the entire person, and fumigation of the apartment, would be safe additions to the preventive measures.

4. Persons who have a marked predisposition to the disease had best not come in close contact with the phthisical. Children should never have tuberculous nurses, wet or dry. In the case of consumptives very great attention should be paid to ventilation, and to the alimentation both of the patient and the attendants.

Such measures, if rigidly carried out, would be of enormous service in preventing this disease. But with the increasing prevalence of tuberculosis among domestic animals, something more is imperatively demanded. Active measures should be taken to free the country from animal tuberculosis. The proper authority for dealing with this, as with all other contagious diseases of animals, is the Bureau of Animal Industry of the Department of Agriculture. It is a wasteful method for States to act independently. The powers and expenditure of this bureau should be greatly increased, and it should take active measures against this disease. The exact measures suggested are, —

1. The reporting of all cases of tuberculosis in domestic animals to the proper authority, by both owners and veterinaries, or other persons having a knowledge of the same.

2. The slaughter of all infected animals, and the isolation and slaughter of all exposed to infection. The government should partially indemnify all owners of slaughtered cattle.

3. Thorough disinfection of all buildings occupied by diseased cattle.

4. The confiscation of the flesh and milk and milk products of all tuberculous animals.

Pasteur's Method.

"Pasteur's method hardly attracts any attention now, and seems to be in a fair way to die a natural death." Such is a statement

made by Dr. Charles W. Dulles, in his report on hydrophobia to the Medical Society of the State of Pennsylvania. In support of this statement, he quotes from a report of Dr. Dujardin-Beaumetz to the effect that there were nine deaths from hydrophobia in Paris during 1887, which was more than in 1880, 1883, 1884, or 1886. Five of these deaths were of persons less than fifteen years old. In one of the cases the patient was not bitten at all, but was simply licked on an abraded spot. Eight of the patients were bitten by dogs, and one by a cat. Two of the nine patients had been treated by Pasteur; and their death is explained by Dujardin-Beaumetz on the ground that his method was not thoroughly carried out. The total number of persons treated by Pasteur was only 306 persons from Paris, bitten by dogs supposed to be rabid, as against about 300 a month one year ago.

These facts, Dr. Dulles thinks, show two very important things. One is, that the application of Pasteur's method has had no effect in reducing the usual mortality from so-called hydrophobia in Paris, which confirms the opinion in regard to its merits which he has repeatedly expressed; the other is, that, in spite of the artificial stimulus furnished by the French reception of Pasteur's method, the number of those who fall into the terror of hydrophobia is diminishing in France, and this leads to the hope that before long France will compare favorably with Germany and America, which have refused to be carried away by the false notions in regard to hydrophobia put forward by one who knows nothing about it but what he has manufactured in his laboratory.

There is a great significance in the fact that disbelief in the theories of Pasteur, which some of his partisans have stigmatized as harsh or unscientific, has been found to go with a singular immunity from the ravages of so-called hydrophobia. This holds true to such an extent that one may safely say that the degree of acceptance of Pasteur's theories in any country will furnish a measure of the number of cases and deaths from hydrophobia. In Germany these theories have never obtained a foothold, and hydrophobia is almost unknown: in America the attempt to import them ended in speedy failure, and here hydrophobia is almost equally unknown.

A detailed account of fifteen fatal cases of hydrophobia is given by the author of the paper. Attention is called by him to the following points, which are brought out in a study of these cases: —

1. *The Effect of Anticipation of Hydrophobia.* — This is said to have been present in seven of the fifteen cases, and may be suspected in more.

2. *The Lack of Evidence of Rabies in the Animal which did the Biting.* — Not one of the animals furnished more than ground for a suspicion that it was rabid. The fact that a fighting dog bites a man who interferes with it, is no evidence that it is rabid, nor is the manifestation of a vicious temper a good evidence of rabies. The same may be said of death in a fit.

3. *The Effect of a Diagnosis of Hydrophobia.* — In ten of the fifteen cases it is stated that the physicians made an early diagnosis of hydrophobia, and presumably they failed to conceal the fact from the patient.

4. *The Effect of applying the Test of the Water.* — This is said to have been done in seven of the fifteen cases, and it was probably done in almost all of them.

5. *The Assertion that Canine Symptoms were Present.* — Five of the patients are said to have whined, or howled, or snapped, or bitten at their attendants.

6. *The Frequency of Forcible Restraint.* — This is said to have been employed in eight of the cases.

7. *The Uselessness of administering Narcotics.* — Powerful narcotics are said to have been used in ten of the cases, and they were probably used in all. Curare is said to have been used in four cases.

In concluding his report, Dr. Dulles says, "I have on several previous occasions declared my belief that hydrophobia is not a specific inoculable disease. I believe this more firmly to-day than ever before. I do not deny that men and women and children sometimes fall into a peculiar state after a dog-bite, and die in due time; but I do deny that this is attributable to any specific virus in the dog's saliva. The same thing has occurred too often from other causes to justify one in charging it to a specific virus when it

ollows a dog-bite. And I believe that the rejection of the specific theory will do more to banish hydrophobia from the world than any thing which we have ever heard of.

"The word 'hydrophobia' should be used only to describe a condition, and not a disease, as we use the word 'convulsions;' and it should be remembered that this condition may be present in a great number of diseases, as I tried to show you when you last met in this city, in 1884.

"I firmly and honestly believe, that, if this view of what is called hydrophobia were generally accepted, the disorder would shrink and disappear, as the geni is said, in the tales of the 'Arabian Nights,' to have shrunk and disappeared when the right word was spoken; and I call your attention to the fact that hydrophobia is now almost unknown in our own State of Pennsylvania. Not a single case has occurred in our State since we last met, and I cannot but attribute this fact partly to the extent to which your judgment confirms the opinions to which my studies of hydrophobia have led me.

"I do not despair of seeing the belief in hydrophobia follow the belief in witchcraft, which once had the support of Church and State, of the medical profession and the laity, but which now, thank God! torments our fellow-men no more. So long, at least, as Pennsylvania presents the spectacle of freedom from the thralldom of ancient superstitions in regard to hydrophobia, and freedom from its curse, I cannot but think that the former has some causal connection with the latter."

INEBRIATE ASYLUMS.—Dr. T. D. Crothers of Hartford, Conn., in an address on "Inebriate Asylums and their Work," delivered at Toronto, Can., draws the following conclusions as being supported by the latest teachings of science and experience: 1. Inebriate hospitals must take the place of jails and station-houses. Such places are dangerous in their mental and physical surroundings, by intensifying the degeneration, and removing the patient beyond hope of recovery. They are in many cases literal training-stations for mustering in armies of chronic maniacs that never desert or leave the ranks until crushed out forever. 2. Inebriate hospitals should receive the incurable inebriates, and make them self-supporting, and build them up physically and mentally. They would relieve the tax-payer, and relieve society of untold burdens of sorrow and misery. 3. Inebriate hospitals should receive the recent cases, and place them in the highest conditions of enforced health and vigor, and thus return a large number to health and sobriety again. 4. Inebriate hospitals can and should be self-supporting when once established. They should be managed on scientific business principles, like military training-schools. 5. Inebriate hospitals should be built from the money raised by taxes on the sale of spirits, on the principle that every business should be obliged to provide for the accidents which grow out of it. 6. These are the realities which every inebriate hospital is approaching, and which all experience points out as practical and literal in the near future. 7. The inebriate hospitals of to-day are only in the infancy of their work, contending with great opposition and prejudice, misunderstood, condemned, and working against innumerable obstacles. 8. The work of the present inebriate hospitals, notwithstanding all the difficulties and imperfections, has the grandest promise for the future, and encouragement for further effort in this field, along the line of scientific research. 9. Lastly, there is an intense personality in inebriate hospitals to each one of us. They may bring salvation and restoration to some one near and dear. They may be fountains of healing whose influence shall cross and influence our pathway in many ways. 10. Inebriate hospitals and their work is the great new land which only a few settlers have reached. They are calling to us to come up and occupy, and thus help the race on in the great march from the lower to the higher.

THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

THROUGH the efforts of Mr. George F. Porter, of the transportation committee, one and one-third rates were obtained some time ago for all delegates travelling to the coming convention in Chicago, in the territory of the Trunk Line Association. It gives us pleasure to now announce that the same active worker has secured the same

rates from the Central Traffic Association, whose territory covers all that portion of the United States lying west of Pittsburgh (Penn.), Buffalo (N.Y.), and Bellaire (O.), and north of the Ohio River and east of Chicago (Ill.). The method of obtaining the return ticket from the Chicago Convention (Feb. 19, 20, and 21) is extremely simple.

First, Each person must purchase (not more than three days prior to the date of the meeting nor later than three days after the commencement of the meeting) a first-class ticket (either unlimited or limited) to the place of meeting, for which he will pay the regular tariff fare, and upon request the ticket-agent will issue to him a certificate of such purchase properly filled up and signed by said ticket-agent. Second, If through tickets cannot be procured at the starting-point, the person will purchase to the nearest point where such through tickets can be obtained, and there repurchase through to place of meeting, requesting a certificate properly filled out by the agent at the point where repurchase is made. Third, Tickets for the return journey will be sold by the ticket-agents at the place of meeting at one-third the highest limited fare, only to those holding certificates signed by the ticket-agent at point where through ticket to the place of meeting was purchased, and countersigned by the secretary or clerk of the convention, certifying that the holder has been in attendance upon the convention. Fourth, It is absolutely necessary that a certificate be procured, as it indicates that full fare has been paid for the going journey, and that the person is therefore entitled to the excursion fare returning. It will also determine the route *via* which the ticket for return journey should be sold; and *without it no reduction will be made*, as the rule of the association is that "no refund of fare will be made on any account whatever, because of the failure of the parties to obtain certificates." Fifth, Tickets for return journey will be furnished only on certificates procured not more than *three days* before the meeting assembles, nor later than three days after the commencement of the meeting, and will be available for continuous passage only; no stop-over privileges being allowed on tickets sold at less than full fares. Certificates will not be honored unless presented within *three days* after the date of the adjournment of the convention. Sixth, Ticket-agents will be instructed that excursion fares will not be available unless the holders of certificates are properly identified, as above described, by the secretary, on the certificate, which identification includes the statement that one hundred or more persons, who have purchased full-fare tickets for the going passage, and hold properly receipted certificates, have been in attendance at the meeting. The certificates are not transferable, and the signature affixed at the starting-point, compared with the signature to the receipt, will enable the ticket-agent to detect any attempted transfer. This convention will undoubtedly be the largest and most interesting which has ever been held, and will be accompanied by an exhibition of electric light and power apparatus and supplies, which will be in a large hall devoted entirely to this purpose.

Electric light and power men who are not now members of the association would do well to join at once, which they can do by addressing the secretary, Allan V. Garratt, at 16 East 23d Street New York City.

So large a number of the representative manufacturers and dealers in the electric light and power apparatus and supplies have expressed a wish that facilities be afforded them to make a very large exhibit at the coming convention of the National Electric Light Association in Chicago, in February, that the executive committee has decided to secure a large hall, where ample room for each exhibitor may be had. Before the committee can proceed further with the matter, it will be necessary to know how many exhibitors there will be, how many square feet of floor space each will want, how many horse-power in steam, how many horse-power from shafting, and how much current and at what electro-motive force. For the purpose of the committee at present, it will only be necessary to have an approximate idea of what is wanted: therefore any intending exhibitors should apply at once to Mr. B. E. Sunny, chairman executive committee, 148 Michigan Avenue, Chicago, Ill.

GINN & CO. announce that the new edition of Lanman's "Sanskrit Reader" is ready.

THE AGASSIZ ASSOCIATION.¹

THE Agassiz Association, as most of you know, is a union of local societies which have been organized for the study of nature by personal observation.

It is not for the sake of any money you may make out of it that we advocate the study of nature. If it were, our association must change its name; for Louis Agassiz used to say that he had "no time to make money." We urge you to join us in this study for the sake of learning what is true. We honor those who set knowledge above "gold and the crystal," and esteem the price of wisdom "above rubies." There is great pleasure in the mere seeking of truth. There is a delight in all discovery.

Now, nature offers to every one of us new gifts every day. No matter how long a beetle may have been known to others, until you have found it for yourself, it is not old to you. So, too, although the species may be familiar, each new specimen has the charm of novelty.

But besides the pleasure of learning, it has been found that one who studies nature aright greatly improves his powers of attention, discrimination, and reasoning. The right way to study nature is to use your own eyes instead of depending upon printed accounts of what somebody else has seen with his. It is a lazy boy who hires another to do his fishing for him. To depend upon the observation of others will no more increase your mental powers than it would improve your muscular development if a friend should swing Indian clubs for you. To one who tries to get all his knowledge of nature from books, every thing comes at second-hand: nothing comes to him as his own discovery. There is no joy in it, and but little benefit. That is why the Agassiz Association always insists upon "personal observation," which is simply a Latinized way of saying, "using your own eyes to see what you can see."

This statement should make plain the nature of the work expected from the little clubs we are organizing in so many cities and towns. The members are to search and find out what there is of interest within, say, five miles of home.

In order to do this, they will make excursions after flowers, minerals, insects, or whatever they most care about, and perhaps make a map showing just where each sort may be found. Of course, they will find a few books useful to help them learn the names of what they find; they will need a cabinet in which to keep their treasures; and they will be glad to have wise men lecture to them now and then, and explain the things that are too hard to study out for themselves. I cannot see that it would do any great harm even if every town and village in the land should have its natural science club, with a little library and museum, and with wide-awake members ready at any time to give the curious traveller an account of all the interesting objects to be found in an afternoon's walk, and able to show him specimens of each variety, nicely preserved, accurately classified, and neatly labelled. All who have read "St. Nicholas" carefully for a few years past, know that the Agassiz Association has organized societies of this sort very successfully, and that the boys and girls — yes, and their parents and teachers, too — have found much recreation in these clubs, and learned much natural history and natural science as well.

During this very year, and since I last wrote to you about our association, more than a hundred new clubs or "chapters" have been added to our roll; and that means more than a thousand new members. You see, there must be at least four in a chapter, and there may be as many more as are desired. One of our chapters, in New Brunswick, N.J., has more than four hundred members, with about a dozen professors to guide them, and there are microscopes, and stereopticons, and all sorts of instruments to aid them in their studies.

After a number of these little clubs are fairly at work in any large city, or throughout a State, they often wish to become better acquainted with one another, and so the clubs hold joint meetings occasionally, and they call these large united gatherings "assemblies."

These assemblies elect their own officers, and hold regular conventions. One of the largest has been formed this year by combining the various societies in Massachusetts. We had a very suc-

cessful convention in Boston on Decoration Day. This holiday happens to occur within a few days of Agassiz's birthday, which is very pleasant and convenient for us. There was an address from Professor Hyatt of the Boston Society of Natural History, a man deservedly popular with young people; and one from Professor Crosby, who has been conducting for our benefit a very interesting course of lessons in mineralogy, extending over more than a year (for which lessons he furnishes the specimens and necessary instruments). Professor Morse of Salem, the author of an excellent book on the study of zoölogy, also lectured to us. Professor Morse's son is a member of a very active chapter of the Agassiz Association, so active that it organized a stock company of boys and built a house for their meetings. Dr. Lincoln, who is now helping the members of our Boston Assembly to make a thorough study of all minerals to be found within ten miles of the Boston State House, was also one of our instructors.

Another of our recently formed assemblies is the State Assembly of New Jersey. Rev. L. H. Lighthipe is president of this assembly; and while I write (Aug. 10), he is conducting a well-attended seaside meeting. It is to continue for a week. Every morning the members make an excursion, under the lead of some expert, and may have the choice of botany, entomology, or microscopy. Every afternoon they gather in the large Educational Hall, and examine their "finds," with the assistance of the professor who led them in the morning. Every evening they attend a lecture, usually illustrated by the gas-microscope or by the stereopticon. Professor Austen, the president of the New Brunswick Chapter, has been very helpful in organizing and managing this pleasant seaside assembly.

The Iowa State Assembly is about to hold its fifth annual convention. Iowa conventions are always successful. All the chapters send delegates, who bring to the meeting not only carefully written reports of the work the chapters have done during the year, but also the finest of the specimens collected. The young men, and young women too, give most interesting accounts of their studies, illustrating them with specimens, original drawings, diagrams, and maps. Then there is a dinner, a meeting for the practical demonstration of their methods of work, and one or two excursions. This assembly offers three prizes each year for the best work done in any chapter since the previous convention.

I must not stop to give in detail accounts even of all our large assemblies; still less can I undertake to tell of the individual chapters. Among so many, it would be impossible to select single ones for special praise. Merely by way of illustration, however, I may mention Chapter No. 3, of Frankford, Philadelphia, which, under the lead of John Shallcross and Robert T. Taylor, has maintained itself in full vigor since the first year of our extension beyond Massachusetts, and which was instrumental in founding the Philadelphia Assembly, the first assembly in the association.

The Manhattan Chapter of New York City is a noteworthy illustration of what young people can do without aid. This society has grown from a handful of boys, meeting from house to house, into a club of a hundred young men, renting rooms at No. 103 Lexington Avenue, and exhibiting there a fine collection fairly representing the natural productions of Manhattan Island. This chapter, like all others, is glad to welcome visitors to its rooms.

The largest chapter in Massachusetts is No. 448, of Fitchburg, with a hundred and fifty members. This chapter has published a handsome pamphlet, giving an account of all the flowering plants to be found in the vicinity.

A new sort of club has been devised and put into successful operation during the year. Chapters of this sort are called "corresponding chapters." They are composed of members who do not live in the same town, but are united by their common interest in the same study. The first of these was the Archæological Chapter. Its President is Hilborne T. Cresson of Philadelphia; vice-president, Dr. C. C. Abbott of Trenton, N.J.; secretary, A. H. Leitch of Dayton, O. The members of this club are grown men; and they propose, under the auspices and general direction of the Peabody Museum of Cambridge, to preserve ancient mounds from the spade of the vandal and the speculator, until they can be properly and scientifically explored under competent supervision. Two other corresponding chapters recently added are the Gray Memorial

¹ From St. Nicholas for November, 1888.

Chapter, for the study of botany, and the Isaac Lea Memorial Chapter, for the study of shells.

It is worthy of mention that from the beginning the girls and women have kept equal step with the boys and men, not only in patient and thorough work in field and laboratory, but also in the work of organization and direction. Many ladies are efficient secretaries, curators, or presidents of chapters, and one girl has held with honor the office of president of a State assembly.

We have been asked why we favor the establishment of societies. Why should not the study be carried on by individuals? All true study, it is claimed by these critics, is prosecuted in solitude and silence. Great books are not written by a society of authors; poets do not sing in chorus; artists do not paint in clubs; and the light of scientific discovery has come to the world in little flashes of illumination, which have fallen singly upon the minds of silent and lonely thinkers.

There is much truth in this argument, and there can be no good work done either in or out of any society unless each separate worker acts and thinks for and by himself. Yet there are important advantages which are secured by united effort. Every one who finds any thing that interests him, wants some one to whom he can show it. A pleasure shared is a pleasure doubled. Thus, at the meetings of our clubs, each member has a friendly audience to listen to the results of his private study. Then, too, when several friends join in a society, they are often able to buy more expensive books and instruments than any could afford alone. A library may be had, a microscope bought, a lecturer secured, a room rented, a building erected. Think, too, of the pleasure of these social gatherings, often enlivened by music and song; think of the pleasant excursions, picnics, or field-meetings, and the occasional evening receptions.

Besides, when we bring several of these local clubs into fellowship with one another through correspondence, exchanges, or a convention now and then, the pleasures and benefits are greatly increased, and many things are done which no single chapter could do. Storms can be traced and their courses represented on maps; erratic boulders can be tracked to their ancient homes; the routes of travel of birds and insects can be followed for hundreds of miles, and facts of interest gathered in every department of science.

One of the most important features of the last year's work has been in this direction. Simple blanks have been sent to different chapters, with the request that they be filled out with records of local observation in particular branches. One boy has prepared a set of blanks on which different observers are writing accounts of all the dragon-flies they may see, telling the place where each specimen was found, its name, description, habits, etc.; and other members have prepared similar blanks for records of observations on birds and minerals. In this way distant parts of the country are brought into friendly acquaintance; and boys of Maine and boys of Florida, girls of California and girls of Massachusetts, become interested in learning one another's thoughts, and in giving one another information and assistance.

Perhaps a more definite idea of what our boys and girls find in their rambles may be gained from a list of a few of the topics upon which members have made original notes during the year. From hundreds may be named these: "Two Rare Fossils from Catskill," "Rose-Leaf Galls," "White Blackbirds," "Ivy-Blossoms," "Curious Trees," "Animals that do not Drink," "Do Salmon Eat Birds?" "Complementary Colors," "An Abnormal Cabbage-Leaf," "A Living Barometer," "Rainbow and Sun-Dogs," "Double Adder's-Tongue," "New Jersey Butterflies," "Eggs of the Crayfish," "Colorado Ants," "Floating Pollen," "A Double Stinger," "Frost Pictures," "An Experience with a Heron," "A White Weasel," "A Strange Mouse," "Girls in a Silver-Mine."

In closing this brief report, I wish, in behalf of the Agassiz Association, again to invite all who are in any way interested in the study of nature to join us, either by organizing societies in their own towns, or, if that be impossible, by joining as individuals. All are welcome, from the oldest to the youngest. We have a council of fifty scientists always ready to receive from our members questions about whatever may puzzle them, and these gentlemen are eager to give all the help they can. We are just about to begin a

course of simple observation-lessons in botany, open to all our members. The plan is to send to every one who takes the course a set of perhaps fifty specimens, nicely prepared, with printed instructions on the proper way of so observing them as to see all that can be seen, and for telling in the proper way all that is seen — and nothing more. To all who would like to consider the question of joining the association, we will send, free, papers giving full directions for organizing a club or a chapter, or for joining alone. We will also send, until the supply is exhausted, an excellent wood-engraving of Agassiz, representing him examining a sea-urchin. This picture is printed on one of the papers of information, but is one of the best likenesses of Professor Agassiz in existence. All who are interested may address The Agassiz Association, 50 South Street, Pittsfield, Mass.

HARLAN H. BALLARD.

NOTES AND NEWS.

A REGULAR meeting of the American Physiological Association was held in the rooms of Jefferson Medical College, Philadelphia, on Dec. 29, and at the University of Pennsylvania on Dec. 31. A number of interesting communications were read. Professor Reichert recounted experiments showing that the anterior columns of the spinal cord possessed no irritability of their own, or that the power of excitability was confined to the posterior sensory columns. He also showed that the rate of transmission of a nervous impulse differed under different conditions. Dr. J. W. Warren described some recent experiments showing that a sensory impulse, such as the explosion of a torpedo, re-enforced the knee-jerk, and drew the curve showing the variation of this re-enforcement with the interval between the sensation and the knee-jerk. Dr. Donaldson showed specimens from which it could be seen that the effect of a long electrical stimulation was to decrease the size of the nuclei of ganglion-cells, and that the amount of this shrinkage was roughly proportional to the duration of the stimulation. Professor Martin in one paper gave the determinations of the minimal and maximal temperatures consistent with life that the blood supplied to an isolated heart could undergo, and in another showed that the variation in the amount of carbonic acid given off by a normal frog and one kept in the dark was due to the optical and not the psychic differences of the two states, because a frog deprived of its cerebral hemispheres acts in this respect just like a normal frog. All of these papers led to interesting discussions; and the discussion of Dr. Reichert's paper induced Dr. S. Weir Mitchell to place at the disposal of the society two hundred dollars, to be devoted towards aiding research upon the rate of nervous transmission, especially in man. The society was hospitably entertained, and found much pleasure in visiting the laboratories of the Jefferson College and the University of Pennsylvania. The members of the society were invited to participate in the International Congress of Physiologists to be held in Basle in 1889.

— Professor F. Janssen, in a recent number of the "Revue Scientifique," describes his interesting and arduous expedition to the Mont Blanc, undertaken in October of this year, in order to study the influence of the atmosphere upon the solar spectrum. It has long been a disputed question whether the oxygen lines are due to the solar or terrestrial atmosphere. This question can be solved only by observations on elevated stations, where the influence of the atmosphere of the earth is very small. In order to make the results still more satisfactory, Mr. Janssen selected the month of October, when the amount of vapor present is small. The ascent was very difficult on account of the lateness of the season, snow having covered the slopes of the mountain and the glaciers. Notwithstanding his advanced years, Mr. Janssen persevered, and, with the aid of a number of experienced guides, reached the Grands-Mulets, where the observations were to be made. He was favored by exceptionally clear weather, and on Oct. 14 observed the solar spectrum. The lines and bands of vapor were absent, and the bands of oxygen decreased rapidly with increasing altitude of the sun. At noon they had entirely disappeared. The lines, on the other hand, were still visible, but had become very faint. From these observations it appears that oxygen does not exist in the atmosphere of the sun in such form as to produce the lines which it produces in the form in which it occurs in the earth's atmosphere

— The American Historical Association held its fifth annual session last week, a large number of members being present. The president, William T. Poole, in his opening address, treated principally of the ordinance of 1787 for the North-west Territory, and called attention to the great need of impartial biographies of Gen. George W. Clark, La Salle, Kenton, and Father Hennepin; Gen. James Grant Wilson gave an account of the evolution of the "Cyclopædia of American Biography;" Dr. A. G. Warner read a treatise on town and county government in the United States; Professor McLaughlin of the University of Michigan rendered tribute to the influence of Gen. Cass on the development of the North-west; Professor Knight of the Ohio State University treated of the history of higher education in that section; Professor Allen of the University of Wisconsin presented a paper on the position of the North-west in general history; and Major J. W. Powell presented a language-map for North America, which has been prepared by the Bureau of Ethnology. It represents in graphic form the results of the investigations of many persons who have been engaged on the work for the past fifteen years. He explained the methods adopted in correlating and classifying the aboriginal tongues, and the historical researches that had been prosecuted to determine the pristine homes of the various tribes. He finally gave a characterization of Indian languages. Other papers were read by W. C. Fisher of Cornell; C. N. Morris of Berkeley; G. Brown Goode, assistant secretary of the Smithsonian; F. A. Bancroft, librarian of the State Department; H. C. Lee of Philadelphia; W. W. Henry of Richmond; and Clarence W. Bowen of New York. Officers of the association for the coming year were elected as follows: president, Charles Kendall Adams of Cornell University; vice-president, John Jay of New York; second vice-president, William Wirt Henry of Virginia; secretary, Herbert B. Adams of Johns Hopkins University; treasurer, Clarence Winthrop Bowen of New York. An executive committee, in addition to the above-named officers, were elected as follows: Rutherford B. Hayes, George P. Fisher, and John W. Burgess.

— At a recent meeting of the Royal Meteorological Society, Rev. I. A. Preston gave an interesting summary of phenological observations for 1888. He said that vegetation was generally backward throughout the season. In the south-west of England and south of Ireland plants were earlier than usual, but not elsewhere. In February they were from one to four weeks later, and gradually gained ground till June. In the south of Ireland they were slightly in advance of the average in June and July; in the south-west of England they just reached the average in July, while in Guernsey they were a fortnight later. Fruits generally were a failure, — very few really ripened, — and, from want of sun, were deficient in flavor. Hay-making was unusually late (as much as five weeks). It began in July or August, and was not entirely finished till late in September. Much of it was spoiled or secured in bad condition. Straw was plentiful, and, though the corn was not an average crop, the fine October enabled farmers to secure a better one than could have been expected. Roots were often a failure, and potatoes were much diseased. Capt. D. Wilson Barker read a paper entitled "A Winter's Weather in Massowah," in which he gave the results of four-hourly observations from December, 1887, to February, 1888; the highest shade temperature being 95°, and the lowest 68°.

— The observation of the total eclipse of the sun of Jan. 1, which was visible over a belt stretching from California to Manitoba, was favored by clear weather, and it is probable that results of great value have been obtained. The principal work was done by the Harvard University party at the Lick Observatory, by astronomers at Norman, Professor Swift near Chico, the Chabot Observatory, and people at Cloverdale. Professor Louis Smith was stationed at Nelson, Cal., and telegraphed the following as the result of his observations of the eclipse: "As far as affording opportunity to search for intra-mercurial planets, it was a failure from clouds and haze. All four contacts were well made, the chronometer watch previously set to Lick Observatory time being used. Five very small colorless protuberances were seen, all having pointed apexes. Near the point of one was another detached from the sun. Bailey's beads were seen at the second and third contacts, but entirely unlike those seen at Denver in 1878. No chromosphere was visible,

though looked for. Mercury, Venus, Vega, and Alpha Cygni were seen. The corona could not be drawn, but as seen through the telescopes it was not very extensive." At Brandon, Manitoba, observations were made. At 3.15 o'clock, central time, 90° longitude, the first contact was observed. At 3.15.34 the shadow had crept over one-half the disk; at 3.15.47, three-quarters; and the totality occurred at 3.16.09. At the quarter a deep-reddish color was observable at the edge of the sun's disk, projecting from beneath the dark body. Immediately after, a sort of halo was formed around the disk, it is difficult to say whether of a greenish or bluish color. It was red at the outer edge, with the color deepening. At 3.15.34 a vibratory motion was visible around the outside of the sun's disk. At the three-quarter obscurity, jets from the upper right and lower left sides and from the lower left horn of the crescent were visible. The corona was irregular, extending to the left and right, — on the left above and on the right below. The corona was observed and sketched very carefully. This sketch was exhibited to other observers, who recognized the irregular shape it assumed. Above and below, the depth was not nearly so great as to the right and left. To the right the illumination assumed an almost square or block appearance, whereas to the left it was narrowest and more elongated. To the observers' view, the inner corona was distinctly visible immediately after totality on the upper left side. This phenomenon grew fainter for 28 seconds, and then more visible, until immediately before the sun's re-appearance, when it was again distinctly visible. On the bottom right-side corner of the inner corona appeared a luminous gold ring, and it was very beautiful during totality. Another observer used his telescope, and secured corroborative evidence of the above. In fact, so well defined was the corona, that to close and careful observers there was no difficulty in agreement. No streamers or filaments were observed. The time of totality, according to one observer, was 56 seconds, and according to another 57. As the eclipse neared totality, the thermometer fell very perceptibly. In fact, it became intensely cold. The vibratory motion already spoken of was distinctly seen on the walls of St. Matthew's Church close by. Stars could be seen stud- ding the deep blue of the heavens. The corona was small and of a pearly lustre. In two places only several long rays were seen. Fuller reports may be expected at an early date.

— In behalf of the American Association for the Study and Cure of Inebriety, the sum of one hundred dollars is offered by Dr. L. D. Mason, vice-president of the society, for the best original essay on "The Pathological Lesions of Chronic Alcoholism Capable of Microscopic Demonstration." The essay is to be accompanied by carefully prepared microscopic slides, which are to demonstrate clearly and satisfactorily the pathological conditions which the essay considers. Conclusions resulting from experiments on animals will be admissible. Accurate drawings or micro-photographs of the slides are desired. The object of the essay will be to demonstrate, first, are there pathological lesions due to chronic alcoholism? second, are these lesions peculiar or not to chronic alcoholism? The microscopic specimens should be accompanied by an authentic alcoholic history; and other complications, as syphilis, should be excluded. The successful author will be promptly notified of his success, and asked to read and demonstrate his essay personally or by proxy, at a regular or special meeting of the Medical Microscopical Society of Brooklyn. The essay will then be published in the ensuing number of "The Journal of Inebriety" (T. D. Crothers, Hartford, Conn.) as the prize essay, and then returned to the author for further publication, or such use as he may desire. The following gentlemen have consented to act as a committee: W. H. Bates, M.D., chairman, 175 Remsen Street, Brooklyn, N.Y.; John E. Weeks, M.D., 43 West 18th Street, New York; Richmond Lennox, M.D., 164 Montague Street, Brooklyn, N.Y.

— The fourth annual meeting of the Indiana Academy of Science was held from Dec. 25 to Dec. 27 at Indianapolis. On Wednesday night Professor J. P. D. John delivered the presidential address, on "Religion and the Law of Continuity." The programme provides for papers to be read in four sections, — zoölogy; botany; geology and geography; chemistry, physics, and mathematics. Among the papers announced, those on zoölogy outnumber those in any other section.

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THE RESULTS of the explorations of the Hemenway South-western Archæological Expedition in 1887-88, under the direction of Frank Hamilton Cushing, promise to be of the greatest importance to our knowledge of ancient America. The plan of the researches is so comprehensive that we may expect they will clear up the history of the natives of the South-west States and Territories and of northern Mexico,—their somatological character as well as the origin and development of their peculiar culture. Mr. S. Baxter, secretary of the expedition, has recently reviewed the most important results hitherto reached. It has been ascertained that the culture of this region was identical with that of Zuñi. The inhabitants of these ancient cities practised an elaborate and thorough system of co-operative river and rain irrigation, and seem to have had a system of canal navigation. They had domesticated animals, notably the turkey, and probably also the rabbit and a variety of the *Auchenia*, or llama. Mr. Cushing has also found facts which lead him to conclude that an entirely indigenous metallurgic art existed; that the natives knew how to reduce ores by smelting, and how to fuse and braze with terra-cotta and cane blowpipes. These researches are of the greatest value, as they are founded on studies of a surviving branch of the peoples once living in these regions, the customs of which serve as a clew to the finds made in the ruined cities. The final results of the expedition will undoubtedly form the starting-point for investigations into the ancient civilization of America.

AN AMERICAN GEOLOGIC SOCIETY.

WITH the activity in geologic investigation during the last decade there has grown up among American geologists the feeling that their work should be more fully co-ordinated and unified, and that more frequent opportunities for personal intercourse should be secured. This feeling took definite shape in 1881, when, at the Cincinnati meeting of the American Association, definite movement was made toward the co-ordination of the Federal and State geologic surveys, and toward the organization of an American geologic society.

The efforts of the geologists in attendance at Cincinnati were not, however, seconded by their absent brethren so warmly as to warrant the founding of the proposed society. The plan has since been kept in mind by its promoters, and during the past summer a call was issued for a meeting of geologists interested in the proposal to form such a society, in Cleveland, on Aug. 14 last. This call was met by a hearty response, and the twoscore of geologists present effected a preliminary organization, adopted a provisional constitution, and appointed a committee to call a subsequent meeting and complete the organization. This committee consisted of Professor Alexander Winchell of the University of Michigan; Professor John J. Stevenson of the University of the City of New York; Professor Charles H. Hitchcock of Dartmouth; Professor John R. Proctor, State geologist of Kentucky; and Professor Edward Orton, State geologist of Ohio.

The meeting for final organization took place in Sage Hall of Cornell University, at Ithaca, on Dec. 27. The attendance was small, but included representatives of a considerable part of the country. Chairman Winchell of the committee on organization presided; a list of 102 geologists, engaged in either original investigation or teaching, who had subscribed to the constitution and paid the entrance-fee, was read; and the provisional constitution prepared at Cleveland was adopted, and the organization thereby rendered complete. The following officers were then elected: president, Professor James Hall, State geologist of New York; first vice-president, Professor James D. Dana, Yale College; second vice-president, Professor Alexander Winchell, University of Michigan; secretary, Professor John J. Stevenson, University of the City of New York; treasurer, Professor Henry S. Williams, Cornell University; executive council, the above-named officers, and the following fellows at large,—Hon. J. W. Powell (director United States Geological Survey), Professor J. S. Newberry (Columbia College), and Professor C. H. Hitchcock (Dartmouth College). Two committees were appointed as follows: committee on revision of provisional constitution, Professor Alexander Winchell, Professor Henry S. Williams, Professor C. H. Hitchcock, Professor J. J. Stevenson, and H. L. Fairchild of the University of Rochester; advisory committee on publications, Professor Joseph LeConte (University of California), Mr. W. J. McGee (United States Geological Survey), Professor N. H. Winchell (State geologist of Minnesota), Professor I. C. White (University of West Virginia), Professor William M. Davis (Harvard University).

According to the terms of the provisional constitution, original fellows of the society comprise working and teaching geologists, who, being members or fellows of the American Association, subscribe to the constitution and pay the entrance-fee before Jan. 1, 1889. In addition to the 102 original fellows thus constituted, sixteen candidates for fellowship were elected at the Cleveland meeting. The society thus starts out with a membership of 118, including nearly every eminent geologist of the United States, and little if any undesirable material, and with a fund (derived wholly from membership-fees) of nearly twelve hundred dollars in the treasury.

It was the prevailing belief at the meeting that the Geologic Society of America is destined to take rank with the leading organizations of related aim in Great Britain, France, Germany, Austria, and other countries; and that, to maintain the high character with which it starts out, it will be necessary to limit the fellowship, and that the legend indicating fellowship in the society ("F.G.S.A.") should be regarded as an honorary title. But one dissenting voice was raised against the last proposition.

The meeting of organization was concluded by an eloquent ad-

dress by the newly elected president, Professor Hall, in which he recounted the history of the development of geologic science in America from its first inception, through the informal meetings of the four State geologists of New York, for discussion of their respective observations, in 1838-40; through the organization of the American Society of Geologists, into which these informal meetings grew, in 1840; through the development of this geologic society into the most powerful scientific organization in the country, the American Association for the Advancement of Science; through the development of the various State and Federal surveys; through the various efforts made for concerted action among American geologists; and down to the completion of the organization of the present society. With every step in this half-century Professor Hall has been identified. The progress has been due to his own efforts perhaps more largely than to those of any other individual. His heart was touched, and his spirit touched, by the recognition of his decades of patient labor; and his picture of the progress of these decades was painted in glowing colors.

The next meeting of the Geologic Society of America will be held at Toronto in August next, in connection with the annual meeting of the American Association for the Advancement of Science.

The Geologic Society of America will hereafter hold regular annual meetings during the holiday week, perhaps in connection with those of the American Society of Naturalists. Biennial meetings for the presentation of papers, for the study of representative geologic areas, etc., will be held each summer in connection with the regular meetings of the American Association, beginning with the Toronto meeting in August next.

AN AUTHORITATIVE DEFINITION OF MANUAL TRAINING.

At the regular semi-annual meeting of the New Jersey Council of Education, held at Trenton, Dec. 26, 1888, a report was received from the special committee on manual training, which contained a definition of manual training. This definition was unanimously indorsed by the council, which is made up of the leading educators of the State. It has therefore more than usual significance, and, if generally adhered to, will not only place the discussion of manual training on the plane which it should occupy, but will render the discussion itself more intelligent and intelligible.

An abstract of the report is presented below. The committee charged with its preparation consisted of Dr. Nicholas Murray Butler of Paterson (chairman), Henry R. Russell of Woodbury, Superintendent C. E. Meleney (now of Somerville, Mass.), S. R. Morse of Atlantic City, and C. C. Stimets of Jersey City.

"It seems most essential at this time that some definite meaning should be attached to the phrase 'manual training,' and some action taken which would clearly indicate the opinion of the council as to exactly what 'manual training' means. It is now used in a variety of senses, and no single, definite idea is connoted by it. We hear of the 'manual-training problem,' the 'manual-training movement,' the 'manual-training school,' 'manual training in connection with geography,' and various other uses of the word, which are strangely incongruous and misleading. Some one use of the word should be selected as the proper one; and it is the opinion of the committee that this council is a body of such educational authority that it may with propriety undertake the decision of this difficult question.

"Sir Philip Magnus, an authority of much weight, says, 'By manual training one commonly means exercises in the use of tools employed in working wood and iron.' Professor Woodward of St. Louis adds to this definition the comment, 'Drawing is understood to be included in the exercises as a matter of course.' These quotations sufficiently illustrate the lack of definiteness with which the term is used even by men of high educational authority. Sir Philip Magnus defines what he means by manual training, and Professor Woodward immediately says that Sir Philip Magnus of course means to include something which he has very evidently intentionally omitted.

"Manual training was first used in this country in the sense in

which Sir Philip Magnus uses the phrase. In the report which Professor Runkle submitted to the trustees of the Massachusetts Institute of Technology, after seeing the European exhibits at the Philadelphia Exposition in 1876, he used the term in this sense; and in consequence of his argument, based in turn upon this use of the term, a school of mechanic arts was added to the courses of instruction already in operation at the institute. It is to be observed that instruction in drawing already formed part of the curriculum of the institute, and that it was not included in the term 'manual training' at the time to which we refer. When, however, the St. Louis manual-training school was founded, and later the manual-training school at Chicago, the phrase 'manual-training' was broadened sufficiently to include instruction in drawing, in addition to the instruction in the tools commonly used in working wood and iron. Judge MacArthur, Mr. Charles H. Ham, Col. Augustus Jacobson, and others who wrote and spoke on the subject of manual training about this time, also used the word in the sense just indicated.

"When, however, the principle of the manual-training school was attacked and criticised, and it became necessary to show on what grounds it could appeal to the public funds for support, it immediately became necessary to examine very critically, not alone the economic arguments which were urged in its favor, but the educational ends which it was expected to serve. It was at once claimed by its advocates that the manual-training school was not a trade school, nor a school for apprentices, but an educational institution, in which certain trades and technical occupations were called upon to furnish material to develop the mental powers of the pupils in certain directions. Immediately this position was taken, it was necessary to show what the mental powers in question were, and why they should be developed in the directions indicated. The advocates of the manual-training school were prompt to reply that that institution was only putting into practice the educational doctrines taught by Comenius and Rousseau, and those which were carried out in another sphere of educational activity by Froebel. With the mention of Froebel and the drawing upon the kindergarten and its fundamental principles for arguments in support of the manual-training school, the narrow conception and application of the word 'manual training' then in vogue broke down, and it began to be used in a much broader as well as a much truer and more significant sense. It is because some who write and speak on this subject use the phrase in its older and narrower acceptance, while others refer to it in its broader and more comprehensive sense, that the confusion to which we have above alluded exists. It seems to us that the council should note carefully the difference between the narrow and the broad use of the phrase, and we urge upon the council the advisability and necessity of giving the weight of its authority to the more liberal application of the words.

" 'Manual training,' in the narrower sense, may be defined as 'exercises in the use of tools commonly used in working wood and iron, together with instruction in drawing.' In this sense, the kindergarten; the movement for drawing and form-study in the primary and grammar schools; the movement for better and more objective methods of teaching history, geography, number, etc.; and the manual-training movement, — are all distinct. That they are, on the contrary, not distinct but closely related, and indeed interdependent, is the decided opinion of your committee. This close relation and interdependence makes the narrower signification of the term 'manual training' at this time an impossible and a wrong one, and lays the basis for the broader and more comprehensive definition. 'Manual training,' in the latter sense, is 'instruction in thought-expression by other means than verbal language and gesture.' It includes necessarily instruction in delineation and instruction in constructive work. Whether or not the tools commonly used for working wood and iron shall be employed for the purposes of giving a part of the instruction in constructive work, is a mere incident.

"We are of opinion that the educational value of proper instruction in the use of tools has been fully proven; but it is not to be supposed that the means of giving instruction in manual training will not improve and develop, as text-books, maps, and other schoolroom apparatus have improved and developed.

"That delineation and construction are natural, early, and simple modes of thought-expression, cannot be doubted, and needs no demonstration before this council. That these modes of mental activity should be trained at school, where the sense-perception, the memory, the reasoning-power, and the verbal expression of thought, are trained, also needs no demonstration. The statement must be accepted as true as soon as it is made; for the proposition that certain mental powers shall be intentionally omitted from the school-training has not as yet found any conscious defenders, though numerous cases might be cited where men have unconsciously argued in support of it.

"The powers of thought-expression by delineation and by construction are among the activities for which Froebel made so prominent a place in his kindergarten. The principle underlying the kindergarten and the manual-training school is one and the same. It must be recognized, and its application extended to the primary and grammar grades. Then we may speak of the manual-training movement and mean something definite thereby, and we may still speak of the manual-training school and mean a school which represents the principle of the manual-training movement in the instruction it offers to pupils of high-school age.

"We urge upon the council the determination to use the phrase in this sense. It is the sense which is warranted by educational history, and the only sense that views manual training as involving the application of a great pedagogic principle, and not as an attempt to improve the methods of high-school instruction alone. We therefore submit the following resolution, and recommend its adoption:—

"Whereas there are several and conflicting uses of the term 'manual training,' be it hereby

"Resolved that the New Jersey Council of Education defines 'manual training' as 'training in thought-expression by other means than gesture and verbal language, in such a carefully graded course of study as shall also provide adequate training for the judgment and the executive faculty.' This training will necessarily include drawing and constructive work, but experience alone can determine by what special means this instruction may best be given."

SCIENTIFIC NEWS IN WASHINGTON.

Sanitary Precautions in Florida. — That "Bureau of Health." — Two Other Bills. — Oil on Water. — The Ores of Nickel Mountain. — Fossil Wood. — National Geographic Society. — Philosophical Society.

Sanitary Precautions in Florida.

THE last three of the weekly health reports of Surgeon-Gen. Hamilton have presented shocking accounts of the deplorable sanitary condition of the cities of Florida, and of the general neglect of health precautions, especially in sewage, that prevails there. The correspondent of "Science" called on Gen. Hamilton, and asked some questions bearing on these reports, eliciting the following statement.

"In general terms," said Gen. Hamilton, "it should be understood that the condition of the towns in Florida, so far as investigated, has revealed a shameful neglect of the commonest sanitary precautions. In Jacksonville the sewage system is quite inadequate, the sewers having been made largely of terra-cotta pipe; and in many of the towns cesspools were constructed where the contents were allowed permanently to percolate the soil. In view of the theory concerning yellow-fever germs being in the alimentary canal and found in the excretions, the conditions existing were exactly those most favorable to the propagation of the disease. If the people of Florida would themselves obey the ordinary laws of self-preservation, and look after their own interests, they would have much less trouble with epidemics. The Federal Government is enforcing in the yellow-fever districts more radical measures than ever before known in the history of this country: establishing gratuitous public laundries for the cleansing of possibly infected bedding and clothes, and fumigating with the consent of municipalities."

That "Bureau of Health."

The following report to the secretary of the treasury, here printed

for the first time, will be likely to seal the fate of the bill which was referred to him for his judgment as to its expediency:—

TREASURY DEPARTMENT,
Office of Supervising Surgeon-General,
U. S. Marine Hospital Service,
Dec. 28, 1888.

The Hon. C. S. FAIRCHILD, Secretary of the Treasury.

Sir, — I have to report, concerning House Bill No. 11,454, that this bill, which offers a reward of \$100,000 to any person of any nationality who discovers the true germ of yellow-fever, is wrongly conceived in my judgment, and should not pass. It was recently made the subject of strong ridicule in the American Health Association, and not a word was raised in its defence. The effect of the mere introduction of the bill has been to flood the bureau with "crank" letters of every description, many of the remedies recommended being preposterous. It will be better for the government to pay the prize as a reward of merit after the discovery shall have been made and established. The history of prizes for the discovery of remedies in times past is a blot on legislation not only in our own country, but in several countries of Europe; and the rewards bestowed have generally turned out to have been improperly given. It is recommended, therefore, that the bill be indefinitely postponed.

Respectfully yours,

JOHN B. HAMILTON,
Supervising Surgeon-General, M.H.S.

Two Other Bills.

Dr. Hamilton has reported favorably on so much of House Bill No. 7,731 as provides for the establishment of a public laboratory in Washington; also on House Bill No. 11,533, providing for a board of yellow-fever commissioners to investigate the sanitary condition of foreign infected places, and to provide for the co-operation of Spain and Mexico.

House Bill No. 11,723, for the creation of a bureau of health, etc., referred to the secretary of the treasury, is reported back to the committee adversely by Dr. Hamilton, whose opinion the secretary asked. It is held that the twenty experts which the bureau would call for could not be had for two reasons: 1. Because there are no such experts whose practice has been limited to scarlet-fever, diphtheria, small-pox, and the like; 2. If there were, \$1,200 a year would not be adequate compensation.

Oil on Water.

The United States Signal Office publishes accounts of eleven vessels which report that they used oil with great effect during the hurricane off the Bahamas in November. The following are some of the reports: Bark "Auburndale" "used oil with great success, safety of vessel and lives of all on board attributed to its use, only four gallons needed;" bark "Hale," "fish oil used in bags at Cat-heads, vessel and crew saved by its use;" brig "Hussey," "blew a hurricane, lay to, and used oil constantly, thus saving the vessel;" schooner "St. Croix," "in constant danger, but all damage prevented by timely use of oil;" barkentine "Retriever," heavy gale, "but rode it out without breaking a rope-yarn, thanks to the use of oil." The vessels seem generally to have used only a few gallons of oil each.

The Ores of Nickel Mountain.

The interesting ores of Nickel Mountain, Oregon, are described in Dr. Day's new volume of "Mineral Resources of the United States."

"The mountain has an elevation of 2,800 feet above Riddle, or about 3,600 feet above the sea. At an elevation of 1,000 feet above the valley, the nickel ores are first found; and from this height, on all sides of the mountain to the very summit, are found beds of ore covering areas from one to twenty acres, and averaging six feet in thickness. The ores are invariably found either in boulders disseminated through a highly ferruginous earth, or in a stratified bed underlain by an altered serpentine. In places the ore in these beds is not more than a foot in thickness, but in others it will run to a depth of thirty feet. Nothing like vein-formation has yet been encountered. Occurring with the nickel ores is chromic iron and chalcidonic silica. Sometimes the latter contains nickel oxides, forming the beautiful gem stone chrysoprase. Nearly all the hydrated nickel and magnesium silicates are found in greater or less quantities at these mines. No nickel minerals other than the sili-

cates have been found. The ore bodies have been developed by numerous cuts, drifts, shafts, and quarries, all of which are in ore that in bulk contains five per cent of nickel. Some two thousand tons of this class of ore are now on the various dumps. No works have yet been erected for treating the ore, but it is confidently expected that the year 1888 will see this inaugurated.

"A specimen of the unaltered country rock from Nickel Mountain was determined by Mr. George P. Merrill, of the National Museum at Washington, as chiefly olivine, with a mineral of the pyroxene group, probably bronzite. The nickel silicates found near Webster, Jackson County, N.C., are the result of the decomposition of an olivine rock, and the occurrence in southern Oregon can be similarly explained. The association with chrome ores adds to the analogy between the two occurrences.

"Lately Professor F. W. Clarke has further substantiated the view advanced by Mr. Biddle as to the genesis of these silicates of nickel, and has extended the comparison to the silicates from New Caledonia."

Fossil Wood.

In a paper read before the Biological Society, Washington, F. H. Knowlton comes to the conclusion that the fossil wood of the Potomac formation is all coniferous. It exists under two different conditions; viz., as a silicified wood, and as lignite, which, owing to the great pressure to which it has been subjected, is much metamorphosed and distorted, and is incapable of specific determination. The former, very perfectly preserved, belongs to two genera, — *Cupressinoxylon*, with four species; and *Araucarioxylon*, with a single species.

National Geographic Society.

The National Geographic Society held its annual meeting for election of officers, presentation of reports, etc., on Friday evening, Dec. 28. The secretaries and treasurer presented their annual reports, and officers were elected for the year 1889 as follows: president, Gardiner G. Hubbard; vice-presidents, H. G. Ogden, G. L. Dyer, A. W. Greely, C. Hart Merriam, A. H. Thompson; treasurer, C. J. Bell; secretaries, Henry Gannett, George Kennan; board of managers, Cleveland Abbe, Marcus Baker, Rogers Birnie, jun., G. Brown Goode, C. A. Kenaston, W. B. Powell, O. H. Tittmann, J. C. Welling.

Philosophical Society.

The Philosophical Society, Washington, elected its annual officers as follows: president, J. R. Eastman; vice-presidents, C. E. Dutton, G. K. Gilbert, G. Brown Goode, H. H. Bates; treasurer, Robert Fletcher; secretaries, W. C. Winlock, J. S. Diller; members at large of the general committee, W. H. Dall, J. H. Kidder, H. M. Paul, F. W. Clarke, C. V. Riley, R. S. Woodward, L. F. Ward, G. W. Hill, Marcus Baker.

COMMERCIAL GEOGRAPHY.

The Iron Industry in the Southern States.

In the "Report on the Mineral Resources of the United States for 1887," recently issued by the United States Geological Survey, James M. Swank gives an interesting report of the recent rapid growth of the Southern iron industry. The activity which was so conspicuous in the latter half of 1885 and in 1886 was continued in 1887 and during the first half of 1888. This activity has been chiefly displayed in the erection of blast-furnaces for the manufacture of pig-iron.

Since the beginning of 1886 there have been built in the States south of the Potomac and the Ohio Rivers twenty-one large and well-equipped furnaces, and fourteen furnaces were in course of erection in those States on July 1, 1888. The total number of furnaces which were in blast on that date, not including those of Missouri, was 109.

There was much comment in Southern newspapers concerning the probable scarcity of a supply of good coke for the new southern furnaces, and the prediction was freely made that some of the new furnaces would be compelled to remain idle until new coal-fields could be found, or fields already discovered could be developed. With the lapse of time it has been found that the supply of good coke from Southern coal-fields has fairly, if not entirely, kept pace with the increasing demand for this fuel for furnace use. New coke-ovens have been built in connection with newly opened coal-

mines, and the quality of coke obtained from the coal of some of the older mines has been improved by more careful methods of selecting the coal and making the coke. There is particularly no longer any apprehension of a scarcity of coke for the supply of the furnaces at Birmingham and in its vicinity. A great portion of the supply is furnished from the New River coal-field in West Virginia, and the Pocahontas coal-field in Virginia. The coke from these fields has been shipped to Carondelet, Mo., and Chicago, at which places it has been used in blast-furnaces in competition with Connellsville coke.

The future of the iron industry of the South appears very promising, as there are certain advantages which other parts of the United States do not enjoy. In Alabama and Tennessee, ores and fuel are found in close proximity, and unskilled labor is cheaper than in the North; but, on the other hand, much of the pig-iron made in these States must be hauled to distant markets at great expense. In fact, no section of our country possesses a monopoly of all the advantages for producing iron and steel. Pittsburgh has natural gas for its rolling-mills and steel-works, and is close to the Connellsville coke-field, but it brings its ores long distances. Chicago is nearer than Pittsburgh to Lake Superior ores; but it is hundreds of miles away from Connellsville coke, and it lacks natural gas as a substitute for raw bituminous coal. In New England but little iron and steel in their crude forms are now made, but the skill in their manipulation which has been accumulated in two hundred years yet remains. The iron industry of the Rocky Mountain region will always have the stimulus of a home market remote from destructive competition. There is room in almost every section of this great country for the iron and steel industries, which have in later years been so wonderfully developed, and which are destined to expand still further.

FRENCH KONGO. — In order to develop the resources of the French Kongo, it has been proposed to establish a line of steamers running between some French port, Senegambia, and Gabun-Kongo. It is estimated that the line will require an annual subsidy of \$140,000. While the Marseilles Geographical Society indorses this scheme, Lieut. Mizon, who spent many years in the interior of the colony, and to whom we owe our present knowledge of its topography, opposes it, on the ground that the trade of the colony is unable to sustain an additional line of steamers. His remarks show that the French Kongo has developed very slowly since 1870. In that year the colony embraced the Bay of Gabun and the delta of the Ogowe. Its trade amounted to \$500,000 annually. In the following years it did not increase; but, after De Brazza's exploration of the upper Ogowe, more caoutchouc and ivory were shipped. At the same time, however, the trade in dye-woods, ebony, and wax, declined on account of the devastation of the forests. The total amount of import and export in 1882 was estimated at about \$2,000,000. Since that time it has not increased. This trade is principally in the hands of an English and a German house, who have regular lines calling in all ports of any importance between Madeira and the mouth of the Kongo; and even to them the produce of the Gabun is of little importance as compared to that of other parts of the coast. The slowness of progress in the French Kongo is principally attributed to the lack of communication with the interior and the absence of factories on the head waters of the rivers. The resources of the interior must be developed, and the natives induced to sell their goods to trading-posts in the interior, which will thus be able to collect enough valuable cargo to make the trade between Europe and Gabun more remunerative. Lieut. Mizon's considerations are of special interest when compared to the actions of the Belgian Company trading with the upper Kongo. The latter concentrates all its energies upon the establishment of good communication with the upper Kongo, and to a systematic exploration of the commercial products of that region. Undoubtedly its endeavors will finally result in producing a remunerative traffic between the remote regions of Central Africa and Europe.

BOOK-REVIEWS.

Favorite Authors for Children. By Mrs. FRANCES A. HUMPHREY. Chicago and Boston, Interstate Publ. Co. 16°.

THIS little book contains brief sketches of certain authors who have written more or less for young people, though only a few of

them have made a specialty of such writing. They are twelve in number, some of them still living, while others are dead, and all are Americans. Mrs. Humphrey's object in writing the book has been to give children some idea of the authors themselves as men and women rather than to criticise or describe their writings. Only a few of their more popular works are noticed at much length, the rest being merely mentioned; but many interesting anecdotes of the authors themselves are related, and all in a style that young readers will not only understand, but enjoy. Some of the authors, such as Longfellow, Bryant, Holmes, and Mrs. Stowe, are quite widely known, while others have a narrower reputation; but an author's capacity as a writer for children is not to be measured by his success in other directions. It is evident, too, that the fashion in children's books varies from age to age; for those here noticed are quite different from the Rollo books and the writings of "Peter Parley," which were in vogue forty years ago. Mrs. Humphrey's book gives portraits of all the authors mentioned, which will add greatly to its attractiveness for children; and they will perhaps wish that she had added her own to the list.

Eating for Strength; or, Food and Diet in their Relation to Health and Work. By M. L. HOLBROOK, M.D. New York, M. L. Holbrook & Co. 12°.

IN this volume of only 236 pages, the author has discussed a great variety of subjects. He has attempted to combine so much of physiology as concerns digestion with a practical cook-book, and has added a chapter on the alimentary products of the vegetable kingdom. This is one of the books which, so far as we can judge, supplies no want, and its *raison d'être* is inexplicable. The physiology of digestion is much better described in all the school physiologies, and the recipes for the kitchen contain nothing that is especially new or valuable. The composition of the volume is careless, singular verbs frequently being called upon to do duty for a plural subject. There are portions of the book from which teachers could select admirable examples of how sentences should *not* be constructed. We select one of these as an illustration: "After the stomach has done all it can in the way of digesting the albuminous matter in our food, it is passed through the pyloric orifice at its end into the duodenum, in an acid condition." We do not blame the stomach for being in an acid condition, if, after having done its full digestive duty, it is passed through the pyloric orifice into the duodenum. Such treatment would be apt to "sour" the most patient organ in the body; and even the stomach, which has the reputation of being "long-suffering," might justly display its displeasure if called upon to suffer this distortion but once, and much more if asked to do it three times a day throughout a natural lifetime. Other examples of careless composition might be mentioned, but they would add nothing to the one we have selected.

The author's chemistry is equally faulty with his composition. In speaking of the carbo-hydrates, he says that they are called "carbo-hydrates" because chemically composed of carbon and water, and then follows with the remarkable statement that the chemical formula of cane-sugar is, carbon, 12; hydrogen, 11; oxygen, 11; and that of grape-sugar, carbon, 12; hydrogen, 12; and oxygen, 12.

Taken as a whole, this book is one we not only cannot recommend, but which we deem it our duty to condemn.

A Grammar of the Latin Language for the Use of Schools and Colleges. By E. A. ANDREWS and S. STODDARD. Revised by Henry Preble. Boston, Houghton, Mifflin, & Co. 12°. \$1.12.

IN the thirty years since this grammar was last revised, opinions have changed somewhat as to what the contents of such a book should be, and how they should be presented. The reviser has consequently found himself driven further and further from the earlier form of the grammar, and has moulded his materials into a form corresponding better with the present state of Latin philology. Most of the old paradigms have been retained, and others have been added. In the case of the regular verb, the four conjugations are printed side by side, so that they are more easily seen to be really varieties of one conjugation, and their forms are more easily implanted in the memory than when learned in four isolated groups.

Many of the old examples also remain, and some new ones have been introduced.

The general sequence of topics has not been greatly altered, the most important changes being the following: The sections treating of word-formation have been gathered into one place, instead of being distributed among the different parts of speech in connection with their inflection; and the treatment of word-formation is made more effective by giving the pupil some insight into the processes of the growth of words instead of merely classifying derivatives according to their apparent endings. The treatment of adverbs (except their comparison), prepositions, and other particles, has been transferred partly to "Word-Formation," and partly to "Syntax." The rules of quantity have been brought into the early part of the book instead of being relegated to "Versification;" and, while the rules of agreement for adjectives and pronouns remain in their old place at the beginning of "Syntax," the rest of the syntax of such words has been postponed till after the treatment of the cases, in order to secure a more natural progression in the study of syntactic details. On account of the necessary introduction of new matter, no attempt has been made to retain the old numbering of the sections; and the book is divided only into sections and sub-sections, with occasional notes; the three kinds of divisions being distinguished by type of different sizes, the main sections sometimes consisting of two or three numbered paragraphs. This arrangement allows a most detailed reference without the use of long or complicated indications. In the matter of pronunciation the reviser makes no reference to what is known as the English method, for the reason, he says, that "the time seems ripe for sparing the teacher the necessity of choosing between a system accepted by the scholarly world as substantially correct, and one which, though still somewhat sheltered by a conservative tradition, makes the mastery of quantity and even of word-formation unnecessarily difficult."

The third declension is made less of a stumbling-block to young learners by grouping the consonant-stems simply according to their behavior toward the letter *s*, and by presenting the *z*-stems in a progressive series, showing different stages in the absorption of consonant-stem forms. Examples in the use of the subjunctive mood have been supplied with unusual copiousness, in the belief that the contemplation of examples is the surest way to acquire a feeling for the subtle differences between the subjunctive and the indicative. The reviser has evidently tried to keep in mind the needs of the beginner, and, when it has been necessary to introduce the results of modern philological research, they are stated as simply and definitively as possible. At the same time the more advanced pupil is furnished with all that is essential to his work, both at school and in college, until the time when an exhaustive grammar becomes a necessity to him. The more difficult topics are treated in such a way as to be clear, while leaving as little as possible to be unlearned when the pupil's study becomes more mature and scientific. Thus, among many things, the growing custom of German scholars in abandoning the character *j* is followed, while the distinction between *u* and *v* is retained.

The exclusion from the present edition of a mass of details, such as rare exceptions to rules and small irregularities in the linguistic usage of the less-known Latin writers, has failed to reduce the size of the book, because of the improvement in the size of the type which the publishers have been good enough to make. The large type, clear print, good paper, and neat binding make as good a setting as the learned reviser could desire for the result of his labors.

Modern Heliographic Processes. By ERNST LIETZE. New York, Van Nostrand. 8°.

THE present book had its origin in a lecture delivered by the author in 1885. On being requested to publish this lecture in the form of a pamphlet, the author extended his studies and researches, compiling the numerous recipes and suggestions scattered in journals and books, and ascertaining their value. The book is intended for the use of engineers and draughtsmen, who are so frequently in need of a good process for reproducing their drawings. After a brief theoretical introduction on the chemical and physical action of light, the author classifies the processes as processes with salts

of silver, with iron salts, with salts of chromium, and with salts of uranium. He gives practical instructions in regard to the paper to be used, the methods of sensitizing, and the trays and dishes used for the purpose, and describes various forms of printing-frames. He then proceeds to describe the numerous processes that have been suggested, and states their advantages and disadvantages. Formulæ which were found not practical, but which are recommended by reliable authorities, have also been given. The patented processes are included, although they cannot be used generally, in order to give a complete review of the subject treated. The first thousand copies of the book are accompanied by ten specimens of heliographic prints, among which the uranium and carbon prints deserve special mention. The first chapters, in which the methods of sensitizing and printing are described, are accompanied by numerous figures illustrating the instruments and processes.

When Age Grows Young. By HYLAND C. KIRK. New York, Dillingham. 16°. 50 cents.

THE author of this work published a few years ago a speculation on the possibility of not dying, in which he undertook to maintain that it was possible to prolong human physical life indefinitely; and now, in accordance with the fashion of the time, he comes before us with a romance in which he maintains the same view. The story has no very consistent plot, but contains a considerable variety of incident of a more or less interesting character. The principal personage in the story, however, who is known as Daniel Ritter, and who is the advocate of the theory of physical immortality, is by no means an agreeable character. He has some pleasing traits, and is gifted with the power of telepathy, on which some of the main incidents of the story are made to turn. But he wishes to obtain twenty thousand dollars in order to marry the girl he loves, and gets it by defrauding an insurance company. As for the possibility of not dying, which "Ritter" maintains, it depends, we are told, on certain conditions. The first is "to believe it possible;" the second, "to be in accord with the Will of the Universe;" the third, "to make the cause of humanity your own;" and "the final step is the triumph of love in life," whatever that may mean. Now, without entering into the biological objections to such a theory, we would remark that the first of these conditions seems to be the most difficult of attainment. We are told by the prophet of an older gospel that if we have sufficient faith we can remove mountains, but the difficulty with most people is to get the faith, and we apprehend that Mr. Kirk's doctrine will encounter the same obstacle. However, if any one wishes to learn about the theory, he will take an interest in reading this book; for it has at least the literary merit of being written in a good style.

The Battle of the Swash and the Capture of Canada. By SAMUEL BARTON. New York, C. T. Dillingham. 16°. 50 cents.

THIS little book is of the "Battle of Dorking" class. It purports to be an account of an attack upon New York by a British fleet in the year 1890, together with other exciting events, including the capture of Canada, which occurred in the same year. The reason for the book's existence, and the keynote of the author's rather lively tune, may be found in the dedication of the volume, which runs as follows:—

"To the senators and ex-senators, members and ex-members, of past and present Congresses of the United States of America, who, by their stupid and criminal neglect to adopt ordinary defensive precautions, or to encourage the reconstruction of the American merchant marine, have rendered all American seaport towns liable to such an attack as is herein but faintly and imperfectly described, this historical forecast is dedicated; with much indignation and contempt, and little or no respect."

The author "makes his title clear" by explaining to those of his readers not familiar with New York waters that the Swash is a straight channel, forming a sort of hypothenuse to the two sides of the main ship-channel, which bends almost at right angles at the south-west spit in the outer bay. The admiral of the British fleet selected this channel as his base of operations against New York. "Blinding buoys," torpedoes and torpedo-boats, dynamite guns and gunboats, submarine boats, and various other devices, played a

more or less important part in defending the city against the enemy. But the most effective work was done by two insignificant-looking boats,—evidently invented by the author,—which involved a new principle of marine warfare as applicable to harbor defence. These boats carried no arms or ammunition excepting a hollow steel ram containing two tons of dynamite. Almost completely submerged, and travelling at a speed of thirty miles an hour, they made for two of the most formidable of the British ironclads. When so close to their victims that there was no risk of missing the mark, the pilots of the boats, the only men remaining aboard, quietly dropped overboard, to be afterward picked up. The rams penetrate the sides of the ironclads, two explosions follow, and there is nothing left of either but fragments. Notwithstanding all this, the British fleet enters the upper bay, and, at the end of two days' bombardment, the Brooklyn navy-yard, the East River bridge, and the lower part of New York City are utterly destroyed.

But the book must be read to be appreciated. It is well written and interesting, and puts into striking form the essence of the many arguments advanced from time to time for "restoring our merchant marine, strengthening our coast defences and the navy, and supplementing the latter by a naval reserve."

More about the Black Bass. By JAMES A. HENSHALL, M.D. Cincinnati, Robert Clarke & Co. 12°. \$1.50.

THIS volume is a supplement to the "Book of the Black Bass," by the same author, who is an expert angler and an eminently practical writer on black bass and bass-fishing. He has thought it best to issue this supplement in a separate volume, letting the original edition remain intact, the chapters in both volumes being so arranged as to agree in number and caption. The plan pursued in the original book, of illustrating the tools and tackle by engravings especially prepared for manufacturers, to illustrate their different lines of specialties, has been adhered to in the supplement.

The book is divided into three parts. The first part treats of the scientific history, nomenclature and morphology, general and special features, coloration, geographical distribution, habits, and intelligence and special senses of the black bass, and on stocking inland waters with them. Fishing rods, reels, lines, hooks, artificial flies, artificial and natural baits, and miscellaneous implements, receive attention in the second part. The third part is devoted to the philosophy of angling, conditions governing the biting of fish, the black bass as a game-fish, fly-fishing, casting the minnow, still-fishing, trolling, and skittering and bobbing. The volume will be welcomed by every genuine angler who "loves angling for its own sake," while even the pot-fisher, who "likes fishing for the spoils it brings," may find in it valuable hints that will increase his income.

AMONG THE PUBLISHERS.

AT last we are treated to a novelty in the way of almanac-making. Dr. J. C. Ayer & Co., the well-known manufacturers of Ayer's sarsaparilla, Lowell, Mass., send us their "Almanac for 1889," in the shape of a good-sized book, embracing editions in English, calculated for the various sections of the United States, the Dominion of Canada, India, South Africa, and Australia; also editions in nine other languages. The volume contains, also, specimen pages of pamphlets issued by the company in eleven languages not represented by the almanacs, including Greek, Turkish, Armenian, Chinese, Burmese, and Hawaiian,—twenty-one languages in all. From the preface we learn that no fewer than fourteen millions of these almanacs are printed yearly. A copy of this favorite almanac may be had at your druggist's. It is a species of "yellow covered literature" of value.

—Never without some papers which are sterling contributions to political and social science, "The Atlantic" for January has in this department "A Difficult Problem in Politics," by Frank Gaylord Cook, the problem being how to attain "uniform legislation" throughout the Union; and one of Lillie Chace Wyman's "Studies of Factory Life," this time of the relation of "The American and the Mill." Professor Shaler of Harvard University considers "The Athletic Problem in Education;" and there are papers by Philip Dymond, on "Von Moltke's Characteristics," and by John Fiske, on "Washington's Great Campaign of 1776."

— The most important article in the "Political Science Quarterly" for December is by Professor Theodore W. Dwight, on "The Legality of 'Trusts.'" The writer considers the common-law doctrine respecting restraint of trade, and other principles bearing on the question, and reaches the conclusion that trusts are partnerships, like any others, and that unless they can be shown to have been formed *with the intent* of raising prices unduly, or for some other distinctly unlawful purpose, they are lawful under the law as it now stands. He then goes on to maintain that the constitutional provision that no man shall be deprived of liberty without due process of law, forbids the State to interfere with them; or, in his own words, if the trust "is *now* lawful as a reasonable and proper element in production, it cannot properly be made unlawful by legislative acts of a stigmatizing character;" which seems rather singular doctrine. The sale of intoxicating liquors is now lawful in the State of New York; but is the Legislature forbidden by the Constitution to prohibit it? Besides this paper of Professor Dwight's, there is an article by Professor Hadley on "Public Business Management" that is worthy of attention. The writer considers the question in various aspects and with reference to recent examples, and reaches the conclusion that the management of business enterprises by the State or the city has not thus far proved very successful. On the other hand, Mr. William Clarke, in discussing "Socialism in English Politics," maintains the opposite view, and predicts the rapid growth of State socialism in England. Professor Burgess treats of the law recently passed, regulating the electoral count, by the Houses of Congress, and pronounces it nothing but a makeshift. The concluding essay in the review is by two English writers, on "The Ballot in England," and gives both a history of the subject and an account of the kind of ballot now in use there. At the present time, when the question of ballot reform has become important in America, this article will be found useful.

— The Worthington Co. have ready "Our Presidents," by Virginia F. Townsend, giving the lives of the twenty-two Presidents of the United States, enlivened by anecdotes and romantic incidents in the lives of the men who received the highest honor in the gift of their countrymen. The fine steel portraits of these men are the work of H. B. Hall & Sons, and are executed with great care. In these days of all sorts and conditions of reproduction processes, it is a rest to the eyes to see the solid steel engravings of former days once more. The publishers get out this timely work in an *édition de luxe* limited to five hundred copies, with portraits printed on India paper, and the volume is handsomely and appropriately bound in rich red cloth with title on white label.

— G. W. Smalley, in the "New York Tribune," Dec. 14, states that an interesting, even surprising fact relating to America came out at Dr. Robertson Smith's dinner to the "Encyclopædia Britannica" contributors. Mr. Black, one of the publishers, told the company the entire circulation of the new ninth edition was fifty thousand copies, of which forty thousand went to the United States; Americans, that is, have bought four times as many copies of the best English encyclopædia as the English themselves have. America has, in fact, absorbed a million quarto volumes of this great work. These figures, we presume, refer only to the editions handled in this country by Little, Brown, & Co. and Charles Scribner's Sons, and do not include the two reprints of the J. M. Stoddard Co. and of the combination using the photographic process.

— From January, 1889, when Vol. XI. will begin, "The American Chemical Journal" will appear in *eight numbers a year, instead of six as heretofore*. As far as may be practicable, one number of about seventy-two pages will be issued each month of the year, excepting July, August, September, and October. For some time past the supply of articles submitted for publication has been so great as to require the entire space of the journal, and the editor has found it impossible to continue the reviews, reports, and abstracts which formed a somewhat prominent feature of the earlier volumes. It is proposed now to restore this feature, and a strong effort will be made to secure such reviews and reports as will give a fair idea of the progress of chemistry in its various branches. In consequence of the increase of size, the price will be

raised from three dollars to four dollars a volume. Hereafter all communications in regard to subscriptions should be addressed to the Publication Agency of the Johns Hopkins University, Baltimore, Md.; and editorial communications, to the editor, Ira Remsen, Post Office Drawer 2, Baltimore, Md.

— The "Journal of Morphology" for November (Boston, Ginn & Co.) contains the following interesting articles: "On the Development of *Manicina Areolata*," by Henry V. Wilson; "The Structure and Development of the Visual Area in the Trilobite, *Phacops Rana*, Green," by John M. Clarke; "Further Studies on *Grammicolepis Brachiusculus*, Poey," by R. W. Shufeldt; "On the Relations of the Hyoid and Otic Elements of the Skeleton in the Batrachia," by E. D. Cope; and "On the Affinities of *Aphriza Virgata*," by R. W. Shufeldt.

— "Writing for Young People — Ideal," "Shorthand for Literary Purposes," "Mental Dyspepsia," "Statute Regulations for the Press," "On Quoting," and "Learning to Write," are among the topics discussed in the January number of "The Writer." This unique magazine for literary workers is now in its third volume.

— An interesting experiment in bringing up a baby without shoes and stockings is described at length in the January number of "Babyhood." The experiment was successful, but the medical editor takes occasion to protest against the "hardening process" to which some parents submit their children. "Chilblains and frost-bites" is just now a very seasonable subject, and it is not often that one finds so practical and authoritative a treatment of it as Dr. Bissell offers to the readers of "Babyhood." "Learning to Walk," by Dr. Canfield, deals with a subject of perennial interest to mothers of young children. "Home Instruction for Little Children" will be found particularly valuable in households where the nursery begins to expand into the schoolroom. The letters contributed by mothers include a vigorous protest against the absence of sleeping-car comforts for ladies and children, a rather despairing inquiry as to the limit of a mother's devotion to her children, a striking illustration of the dangers of the fruit-diet to expectant mothers, etc. The "Nursery Observations" record many amusing and curious traits of young children, and the answers to "Nursery Problems" are instructive.

— The "Quarterly Journal of Economics" for January is a university number. Professor Andrews of Cornell writes upon "Trusts;" Professor Patten of Pennsylvania, on "Capital;" Professor Hadley of Yale, on "The Railroads under the Interstate Commerce Law;" and Professor Edgeworth of King's College, London, on "The Appreciation of Gold." Harvard is represented by a copious array of notes and memoranda on various interesting topics, and a review of "The Tariff Literature of the Campaign," and an historical paper on the suspension of specie payment in Italy in 1866, written as a university study by A. B. Houghton in 1886, and now issued as an appendix to this number.

— The long-announced articles by Mr. Charles DeKay, on Ireland, begin in the January "Century;" the first being entitled "Pagan Ireland," with illustrations of the mediæval castle at Clonmichael, the Cross at Monasterboice, the round tower at Ardmore, etc. Mr. Wilson, the photographer, continues his series on the Holy Land in connection with the International Sunday-School Lessons. The present instalment, profusely illustrated, is entitled "Round about Galilee." The Lincoln life in this number deals with three commanding events, — Pope's Virginia campaign, the battle of Antietam, and the announcement of emancipation. An illustrated article on "The West Point of the Confederacy" gives an account of a battle the details of which are little known in the North, and in which the cadets of the Virginia Military Institute at Lexington took a conspicuous and romantic part, suffering heavily in killed and wounded. An essay by Col. Auchmuty tells about a new movement in connection with the subject of American labor. This essay is entitled "An American Apprentice System," and describes a new system of apprenticeship, which Col. Auchmuty considers "suitable to American wants," and which he says "concerns in no small degree the welfare of the nation." Mr. Frederic Remington, the artist, himself writes as well as illustrates.

an article entitled "Horses of the Plains." Mr. Kennan, in an article entitled "The Life of Administrative Exiles," presents some of the most astounding facts gathered by him in Siberia. The article is without illustrations. The writer says in introducing it, that to present a large number of closely related facts concerning this branch of the subject in the chronological order in which they were obtained would be to scatter them through half a dozen articles, and thus deprive them of much of their cumulative force and significance. He therefore groups these facts in a single paper, which necessitates a brief interruption of the narrative, and an omission, for a single number, of the illustrations. This, he remarks, enables him to deal broadly and comprehensively with one of the most interesting and important phases of the exile system. In "Topics of the Time" are discussed "Annexation, or Federation?" "Separate Municipal Elections," the question "Are We Just to our Architects?" and "A Crisis in the Copyright Agitation." "Open Letters" deal with "Lawyers' Morals," the "Life of Lincoln," and "The Mother's Right."

— In the January "Popular Science Monthly" there are four illustrated articles, one of which, "The Guiding-Needle on an Iron Ship," opens the number. In this paper, Lieut.-Commander T. A. Lyons, U.S.N., tells why the various masses of iron on shipboard interfere with the working of the compass, and explains how the trouble is remedied. "House-Drainage from Various Points of View," is the title under which Dr. John S. Billings, U.S.A., describes, with illustrations, the present condition of this complex problem. Very timely and interesting is Mr. W. H. Larrabee's copiously illustrated paper on "Sea-Lions and Fur-Seals." Two articles that will interest teachers and parents are "The Sacrifice of Education," a protest against the abuse of examinations; and "Inventional Geometry," by E. R. Shaw, which tells how geometry has been made a pleasure to pupils using the book prepared by Herbert Spencer's father. Eighteen drawings made by boys and girls in working out the problems are inserted. "Town-Life as a Cause of Degeneracy," is the subject of an instructive paper by G. B. Barron, M.D. The nature of "Genius and Talent" is described by Grant Allen in his peculiarly happy vein. W. D. Le Sueur contributes a strong article under the title "Science and its Accusers," in which he affirms that science is simply truth, and that, while men and theories may properly be criticised, opposition to science is absurd and vain. Professor Langley's address on "The History of a Doctrine" is concluded in this number. "The Suanetians and their Home," is an account, by D. W. Freshfield, of an interesting people dwelling in the Caucasus region. Some additional facts concerning "Gauss and the Electric Telegraph" are given, and the subject of the usual sketch and portrait is Rev. Moses Ashley Curtis, the North Carolina botanist. Professor C. H. A. Bulkley, D.D., contributes a letter on "The Relation of Altruism to Egoism," criticising Mr. Smiley's recent article. The "Editor's Table" deals with "The March of Practical Science" and "The Abuse of Examinations;" and the "Miscellany" and "Notes" are varied and instructive.

— The tenth volume of the "Proceedings of the United States National Museum" has just been issued. The signatures composing the volume were issued from April, 1887, to October, 1888. Like the preceding issues, the volume contains primarily essays on zoölogical subjects, although others are not wanting. The greater part of the work is occupied by papers prepared by the scientific corps of the National Museum, while others treat upon the collections of the museum. In an appendix a catalogue of the contributions of the section of graphic arts to the Ohio Valley Centennial Exposition at Cincinnati is given.

— The fifth volume of the "Mineral Resources of the United States," by David T. Day, has just been issued by the United States Geological Survey. It covers the calendar year 1887. The statistical tables contained in the former volumes have been brought forward, but repetition of descriptive matter has been avoided wherever possible. The result of Professor Day's careful investigations shows an aggregate value of \$538,056,345 for the mineral industries of the United States. This is nearly \$73,000,000 more than the product in 1886, and considerably more than \$100,000,000 in

excess of the year 1885. Of many items which have contributed to this result, all the metals increased in quantity, except gold and the minor metal nickel, and nearly all increased in price. The significance of this is seen in the increased production of the fuels necessary for reducing these metals and preparing them for use. All of these fuels, including natural gas, show a marked increase. The value of building-stone increased considerably, but this apparent advance is principally due to a more careful canvass of this industry than has been possible in previous years. Professor Day does not consider it probable that the great total recorded for 1887 will be equalled in the present year.

— "A Course of Mineralogy for Young People" (Agassiz Association course) is published by G. Guttenberg, teacher of natural sciences in the Erie High School, Erie, Penn. In this course it has been attempted to present the study of stones in such a manner that any bright boy or girl over twelve years of age can, without the aid of a teacher, become a fair mineralogist, being able to examine and determine all of the more important minerals, including the ores of the useful metals.

— The new edition (1889) of "The Electricians' Directory and Handbook" is in preparation. It is published at "The Electrician" office, 1 Salisbury Court, Fleet Street, London, E.C.

— An arrangement has been made by which the "Political Science Quarterly" and "The New Princeton Review" are consolidated. The publishers of the "Political Science Quarterly" (Ginn & Co.) have purchased "The New Princeton Review," and the latter journal will be merged into the former. The political and economic questions to which "The New Princeton Review" has devoted so much of its attention, and which are engrossing more and more the attention of the public, will form, as heretofore, the special field of the "Political Science Quarterly." The point of view and method of treatment which have won for both journals such cordial recognition and such extensive support will remain unchanged. Certain features of "The New Princeton Review" which have specially commended themselves to the public will be incorporated in the "Political Science Quarterly;" and as Professor Sloane, the editor of "The New Princeton Review," will be associated in future with the work of the "Political Science Quarterly," the cause of sound politics can only gain by this union of forces.

— Laidlaw Bros. & Co., 137 West 41st Street, New York City, have just issued "The Declaration of Independence and the Constitution of the United States, in German, French, and English, in Parallel Columns," translated by A. H. Laidlaw, jun.; French and German revised by Professors Hellmrich, Schoeder, and Fezandié. The translations have been carefully made. Historical notes have been interspersed throughout the work, and an appendix supplies interesting tables on matters of permanent importance. Blank pages have been added for the reception of grammatical and historical notes, for the insertion of appropriate clippings from periodicals, and for the collection of references to interesting pages of other works.

LETTERS TO THE EDITOR.

**.*Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The editor will be glad to publish any queries consonant with the character of the journal.

The Soaring of Birds.

To the tests proposed in "Science" (Dec. 7, pp. 267, 268) for Mr. Gilbert's ingenious hypothesis that birds, in soaring, utilize the varying velocities and directions of the horizontal air-currents at different levels, one might perhaps add this: that the inclined planes of the circles described should be observably related to the direction, etc., of the wind at the earth's surface, and of the cloud-drift above. For instance: if the upper current, relatively to the lower, was from the north, we might expect the higher side of the circle to be the north side, or else to be that side along which the bird was flying southward.

The action suggested would clearly be to some extent *efficient*; but would it also be *sufficient*? Can the gradients of velocity, etc., from level to level in air-currents far above us, be rapid enough to give the bird more than a slight assistance, although perhaps he would still avail himself of even that little help? For here is much more than "friction" to be overcome. If a hawk, weighing a pound or more to every square foot of effective wing and tail surface, would fall through the air with outspread motionless wings ten miles an hour, which I believe to be a low estimate, then, to sustain his weight without muscular effort, his horizontal velocity relative to the surrounding air should be not less than fifteen miles an hour. Can it be that air-currents hundreds of feet from the earth, and only a few yards apart, often differ in velocity so much as that? And yet I have seen no other theory that could in the least explain the prolonged soaring of birds, if, indeed, their wings do remain motionless. Much has been said of late, in "Science" and elsewhere, of the locking of certain wing-joints: but this admirable contrivance for relieving muscular fatigue is quite irrelevant to the present problem; for, as Mr. Gilbert has recognized, it provides not a foot-pound of that actual work which, to prevent a fall of ten miles per hour, must be expended at a rate of thirty mile-pounds per hour if the bird weighs three pounds.

A naval officer, whose name I forget, once told me of an observation of his own, which, if confirmed, would remove all difficulties. Standing on deck in mid-ocean in a stiff breeze, he observed certain sea-birds hovering near him with apparently unmoving wings, though holding their own against the wind. But when they came within a few yards, he could see that the outspread wings had in reality a rapid motion of very small amplitude, almost a mere tremor. His impression was, that, though the wings had not sufficient play to present the whole wing edgewise to the air during the up-stroke, and flatwise during the down-stroke, yet the individual wing-feathers might be doing this, their vanes automatically separating and turning edgewise, opening like valves or like slats of a blind, as the wing rose, and closing up again, as it fell, by the action of the air itself. Some such action of the feathers would greatly aid this kind of flight. It is for naturalists to say how well they are adapted to it, and whether such flight might be possible while the wing-joints remained locked, and whether it might therefore be sometimes a restful change for the bird.

J. E. OLIVER.

Cornell University, Dec. 19.

Cucullaris Propatagialis in Oscinine Birds.

SOME time ago ("Science," ix. 1887, pp. 623, 624), Dr. R. W. Shufeldt announced the alleged discovery in the bird-wing, of a muscle well known as *Cucullaris propatagialis*, as being particularly characteristic of the suborder *Oscines* (or, as I call them, the superfamily *Passeroideæ*), special stress being laid on its taxonomic value in distinguishing the latter from the mesomyodian *Passeres*. In a subsequent number of "Science" (x. 1887, pp. 70-72) I demonstrated that the muscle in question is particularly well developed in parrots and woodpeckers; and I also stated that I had found it, though in a rudimentary state, in some of our typical mesomyodian *Passeres*, notably in *Tyrannus tyrannus*.

Through the courtesy of Mr. Frederic Lucas, I have since been enabled to dissect a fresh specimen of the Nepal Hill-Myna (*Gracula intermedia*), a sturnine bird from India. I found the *Cucullaris propatagialis* quite as rudimentary as in the *Tyrannus* alluded to. As *Gracula* undoubtedly belongs to the *Oscines*, it has been fairly demonstrated that the muscle in question is neither peculiar to the *Oscines*, nor especially characteristic of them.

In looking further into the literature, I find, also, that Fürbringer has recorded the same muscle as being rudimentary in the following oscinine birds, — *Lamprolornis insidiator*, *Pastor roseus*, *Myiagra cerulea*, *Ixos chrysorrhoeus*, *Copsychus macrurus*, and *Turdus pilaris*, — while in many others he found it but very feebly developed.

It is evident, therefore, that this variable muscular slip has no taxonomic value whatever in the direction indicated by Dr. Shufeldt. I even doubt whether it will be found of much service in defining trenchantly even families or smaller groups, since every

possible gradation between the rudimentary stage and the most highly developed condition seems to occur within the same group of unquestionably nearly related birds.

LEONHARD STEJNEGER.

Smithsonian Institution, Washington, D.C.,
Dec. 20.

Answers.

39. ORIGIN OF FISH IN ISOLATED PONDS. — If no one else will answer Mr. C. B. Palmer's question, let me point out that nothing seems simpler than that birds, lighting on the edge of first one pond, then another, should carry on their feet the eggs, larvæ, or whatever it may be, of one to the other. In digging wells in a quite desert region in Arizona, many miles from other wells, I was at first surprised to find them peopled after a short time with animals (frogs, if I forget not) which could not possibly have hopped or crawled from the nearest water, across the burning sand in mid-summer, with the thermometer rising above 115° F. But I soon saw the above easy explanation.

HENRY M. HOWE.

Boston, Dec. 22.

40. FELSPAR, OR FELDSPAR? — The note on the spelling of the word "feldspar," in "Science" of Dec. 14, is satisfactory with the exception of its closing sentence, which says that the form "felspar," although wrong, had been so long employed that "no one who prefers it can be criticised for using it." It should be added to this, that all other nations except Great Britain and her colonies, and also that ninety-nine hundredths of all mineralogical literature, spell the word with the *d* (or with the substitute *t* if the language requires it), and they do so because this is etymologically right; that the English drop the letter because the error in Great Britain has been persisted in until it has become *English*; and that such national prejudice is not a legitimate ground for scientific action even in Great Britain. Years since, the writer, thinking, like many others, uniformity in scientific nomenclature very desirable, sent a short paper, giving the British history of the word, to the "London Philological Magazine," which was accepted, and published anonymously as was requested. But national prejudice proved to be superior to all other considerations. In this country the prejudice has no right to a place, and the transplanting of its effects should not be allowed without a protest.

J. D. D.

41. THE "SUPERNUMERARY MOLAR" IN MAN. — As a partial reply to Query 41 in "Science" of Dec. 7, permit me to state that Dr. Shufeldt will find in skull No. 1327, of the Morton collection in the Philadelphia Academy of Natural Sciences, the finest specimen extant of molars posterior to the third or "wisdom" teeth. It is some years since we saw it, and then "as through a glass" only; but our recollection of it is that the superior fourth molars are quite through the alveolar process, while the inferior are just seen from above in their course to the surface. The superior fourth molars are not "peg-like," but molar-like, though smaller than their neighbors. The specimen is Australian. We have a personal acquaintance who has eighteen teeth in the upper jaw; the "extra" teeth, one on each side, posterior to the third molar or "wisdom" teeth. Like Dr. Shufeldt's specimen, these are "conical, peg-like," as to form of crown. According to dental writers, the African races seem specially favored in this matter. For the best account of this structure in man (assuming it to be "supernumerary"), reference is made to the late Dr. M. S. Dean's translation of Magitot and Segros' "Dental Follicle," in which it is made to appear that the setting of an epithelial structure, and the enamel organ, determine the fact and position of the future tooth. The same process is made to account for "supernumerary" teeth elsewhere in the maxillæ, the anterior part of the upper being particularly favored. As to its significance, facts are accumulating that seem to point to the weeding-out of the third molar or "wisdom" tooth, the number and importance of the facts being directly as civilization. Such being the case, is it unreasonable to suppose this occasionally-cropping-out fourth molar other than a reversion to a past type, and to a time in the history of man when mastication was the primary, and not as now, in the civilized world at least, a secondary function?

L. E. J.